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OUTLOOK FOR TUBERCULOSIS CONTROL IN THE CIVILIAN POPULATION[1]

THOMAS PARRAN[2]

The present outlook for the conquest of tuberculosis is indeed encouraging. But those of us who have fought the long fight together so many years know from experience that the final struggle will not be easy. For centuries before Koch's discovery of the tubercle bacillus, the White Plague ravaged our civilization without let or hindrance. Aided by a rapidly rising standard of living, the health forces of the nation (with strong prodding from the National Tuberculosis Association) prosecuted a successful first campaign. The death rate from tuberculosis in the United States was halved and halved again between 1900 and 1940.

Tuberculosis control was one of the first activities in public health in which the coöperation of the public and the profession led to substantial advances. This was the first instance in which we undertook to control a disease, not by specific immunization or quarantine, but essentially by the power of public education.

Our early successes however were destined to encounter stubborn resistance. There are many reasons to account for the leveling off of accomplishment and the lack of progress in the last ten years. In 1937, Wade Hampton Frost considered that in the country as a whole we had tipped the biological scales against the survival of the tubercle bacillus, providing control were maintained at the same level and that no decrease in human resistance to the disease occurred. To put it another way, tuberculosis in an unchanging society and subject to existing controls was no longer self-perpetuating and would eventually disappear. Many lives would be lost needlessly in that evolutionary process, however. Existing control measures were bound to prove less effective as the disease retreated into strongholds less easy to discover and breach. Indeed, it is a common experience in public health work that frontal attack on a wide-spread disease produces dramatic results in the initial phase, followed by a lag as the volume of infection diminishes.

As we view public health developments broadly, we see that we make progress —not evenly all along the line, against all diseases and conditions, nor continuously against a single disease, but because of some development in science, stirring the public interest, we are enabled to push ahead against one or another of the killers.

The development of diphtheria toxoid made it possible for us substantially to eradicate that disease. Recently we have seen nation-wide interest in the control of the venereal diseases and a substantial national program is now underway with gratifying results in the control of syphilis and gonorrhoea.

[1] Presented in the symposium on *Tuberculosis and War* at a joint session of the Medical and Public Health Sections at the 40th annual meeting of the National Tuberculosis Association, Chicago, Illinois, May 12, 1944.

[2] Surgeon General, U. S. Public Health Service, Washington, D. C.

Tuberculosis now comes to the fore again because scientific advances have awakened public interest. Recent technical developments make it possible to find cases cheaply and to find them early. The war, which has threatened the stability of our civilization, with consequent lowering of resistance to the disease, has directed renewed attention to tuberculosis control.

The stage is set, then, for a coördinated attack with the objective of eradicating—not merely controlling—tuberculosis. This is more than an altruistic dream; it is an urgent necessity, a practical goal.

WAR AND TUBERCULOSIS

Long wars accompanied by privation always have resulted in appalling increases in tuberculosis. In past centuries, this fact was masked by the immediately apparent catastrophe of acute epidemics. It remained for the World War of 1914–1918 to reveal tuberculosis as a major war problem. By 1917, the French Army had returned 150,000 tuberculous soldiers to civilian life. Thousands of exchanged prisoners of war had acquired the disease and were returning to France. All European nations, both neutral and combatant, experienced a rise in tuberculosis mortality varying from 10 to 20 per cent. Colonel Esmond Long has recently made the conservative estimate that tuberculosis mortality rose 15 per cent in all Europe for three years, "which would credit the war with about 200,000 tuberculosis deaths."

History has repeated itself tragically in this war, and with a ferocity inspired by the policy of the Germans to exterminate large groups in the conquered nations by slow death. It is known that tuberculosis is raging with epidemic force in conquered Europe to-day. In France, Professor André Mayer has reported that tuberculosis is epidemic and that, because of food shortages, a diagnosis of tuberculosis is almost a death sentence. Bigwood has reported a comparable situation in Belgium. Even Great Britain has experienced a 13 per cent increase in tuberculosis mortality since the war began.

Crowding, fatigue, malnutrition, increased exposure, mass migrations of population—all these favor the spread of tuberculosis in wartime. Although we cannot yet point to a nation-wide increase in tuberculosis mortality in the United States, indications in certain parts of the country are that such a rise will soon become apparent.

THE PUBLIC HEALTH SERVICE WAR PROGRAM

Recognizing this potential threat the Public Health Service has sought a means to avert it. Prior to the outbreak of war in 1939, we had become interested in the possibilities of the small-film X-ray as a public health method for mass case-finding. Intensive coöperation studies carried on for several years resulted in improvement of the technique to the point where its effectiveness could be clearly demonstrated. The time seemed ripe, therefore, immediately after Pearl Harbor to put this new tool to work with a view to checking the spread of tuberculosis in the most vulnerable group of civilians, namely, the workers in war industries.

Accordingly, we used a part of our Emergency Health and Sanitation appropriation to establish a small tuberculosis control office and to put into the field several mobile X-ray units to conduct case-finding surveys in war industries. We had also a responsibility to the greatly expanded United States Coast Guard and routine X-ray examinations were instituted at its training stations. As you know, both the Navy and the Army made the inclusion of chest X-ray examinations obligatory for all recruits.

In the two and one-half years of operation, our wartime tuberculosis program has more than proved its worth. In fact, "We started something." We have continually improved our performance with the small-film technique, so much so that a single unit can take and process, on the average, 500 films in an eight-hour day. With a double staff, the machine could work two shifts and complete 1,000 examinations in twenty-four hours. This past year, one of our medical officers, Dr. Russell H. Morgan, formerly of the University of Chicago, has perfected a phototimer for use with the fluorograph. This device doubles production and improves quality of the picture.

At no time have we had more than eight units in the field and because of budgetary limitations we have never been able to meet all the requests for this service. During the coming fiscal year, 1945, we shall be able to expand this service moderately. In fact, the Public Health Service has been somewhat like the Dutch boy who took the initiative and plugged the hole in the dike with his hand until help arrived.

Despite the limitations, we have these accomplishments to report. Nearly three-quarters of a million persons—war workers and their families—have been examined. More than one in every 100 (1.3 per cent) have shown evidence of reinfection tuberculosis. The great, the encouraging significance of these findings is that 62 per cent of the cases discovered in our surveys are in the minimal stage when recovery is almost certain with good care. Thirty-one per cent of the cases are moderately advanced; and 7 per cent far advanced. This is almost a complete reversal of past experience, when not more than 10 per cent of the patients coming to treatment for the first time were in the early stage of their disease.

During the past year, we have also been able to give a little help in consultant service to states desiring to strengthen their tuberculosis control work.

Our experience in these two years of war service has proved of value in shaping the final attack. We are under no illusion that the discovery of one, or a thousand, or a million cases of tuberculosis will alter the course of the disease in this country, unless the cases discovered receive needed care to prevent further spread.

THE BURDEN OF TUBERCULOSIS IN THE UNITED STATES

No stratum of society is free of tuberculosis. No family is truly safe as long as the disease smolders in any sector of the community. On the average, nearly 60,000 persons die of tuberculosis in this country every year. About half of them are men and women in the most productive years of life. Tuberculosis

has been listed seventh among the important causes of death in the general population for a number of years; it is the *first* cause, except accidents, among young adults, fifteen to thirty-five. In the colored population, it is the *second* cause of death, all ages, exceeded only by heart disease.

Indeed, American Negroes and Indians and Americans of Spanish-speaking races bear from three to six times their proportionate burden of tuberculosis. Among Negroes twenty to thirty-four years of age, one in every 3 deaths is due to tuberculosis; while among their white neighbors of the same ages, the ratio is one in 6. To-day the tuberculosis mortality in the colored population stands at a higher rate than among whites in 1919!

The interrelationship of poverty, ignorance and disease is nowhere more clearly demonstrated than in the prevalence of tuberculosis. From the earliest studies of sickness and occupation, we have known that this disease is an important cause of death among industrial workers. In the United States, tuberculosis kills seven times more frequently among unskilled workers than among professional groups.

The disease works its greatest havoc among low income groups. Despite increased employment in wartime, higher wages in some occupations and an all-time high national income, the economic stratification of the nation has not changed. There are still low income groups. The tremendous expansion of industry, together with increased employment of women, older men and under-draft-age boys, has accelerated the exposure to tuberculosis.

The colored population is at the bottom of the economic ladder. Their homes, now as before the war, are the most miserable; their daily diet most out of balance; and their ability to purchase health service and other necessities of life is the least. No plan to rid American life of tuberculosis can overlook this close alliance of poverty and disease.

The war has also been accompanied by great shifts in the industrial population, as war industries have blossomed in areas ill-prepared to deal with increased health problems. Many war workers who are not residents of the communities where they are now employed have broken down with tuberculosis. They cannot always receive sanatorium care at public expense because they are not eligible under local residency laws. Many cannot be returned to their original homes for care, because there they have lost residency. It is no wonder that state health departments are greatly concerned about the nonresident war workers and their families who develop tuberculosis.

In 1938, it was estimated that the United States maintains a tuberculous population of 1,500,000. If we apply to the total population the percentage of cases found in our X-ray surveys among war workers and their families, we arrive at about the same figure. The notable difference is that, in 1938, the estimate was based on deaths; to-day our findings are represented by the living—known patients who can be helped, the vast majority of them saved from premature death.

In the large group of known cases revealed by mass X-ray surveys, there are over 100,000 young men and women rejected at the examining and induction

stations of the armed forces. The Public Health Service has coöperated with the Army, Navy and the Selective Service System in bringing those rejected for tuberculosis to the attention of their state health departments for follow-up and treatment. The results to date have not been good, largely because available resources in personnel and facilities are not adequate for the task.

Already many veterans of World War II have been discharged because of tuberculosis. Although these men are eligible for care by the Veterans Administration, about one-third of those who enter the hospitals leave in a few weeks' time and return to their home communities, where they become a public health problem.

JOINT RESOURCES IN A JOINT ENTERPRISE

Now that it is possible to raise the visibility of our tuberculosis problem in every part of the country, we have no reason for delaying a concentrated attack. Beginning in true public health fashion where there is the greatest opportunity for life-saving, we should direct all available resources in a determined, systematic and continuing drive against the tubercle bacillus until we have attained a final victory.

The modern concept of public health control is as simple as it is sensible: Find all cases early; treat all patients, continuously and competently. Underlying both is education. These have been the guiding principles of the national venereal disease control program.

A comparable job needs to be done in tuberculosis control, but only if public and private agencies work side by side in a joint enterprise, utilizing joint resources, may success be expected.

As I see it, a national program of tuberculosis control is necessary. It can be developed from the foundations laid by the National Tuberculosis Association, the Public Health Service and the state health authorities.

The need for nation-wide, coördinated effort is obvious. Not more than half of the 48 states now have full-time medical officers in their health departments to conduct an efficient, basic program of case-finding and follow-up. Not more than half have sufficient clinic facilities for the follow-up of ambulatory patients. Very few state health departments have efficient tuberculosis record systems, which are so essential in control procedures.

As we have seen, wartime migration has further emphasized the national character of the problem. Anticipated postwar migrations are sufficient reasons for immediate action to equalize the effort against tuberculosis geographically. The load is heaviest in the poorest states. But no matter how effective the control in a single state, its citizens are not safe until the citizens in all states receive comparable protection.

More research is needed, in at least three important fields. We have already seen the value of limited research in public health methods and equipment. It is reasonable to assume that further improvements can be made by intensified research in their field. Expanded research on chemotherapy in tuberculosis is indicated. It is difficult for us to realize that the prevention and cure of tubercu-

losis is still dependent upon the frailty of the bacillus and the relative strength of the patient's natural resistance. More research is needed to find, if possible, a specific cure. Finally, epidemiological research on a world-wide basis is essential if we are ultimately to conquer tuberculosis. This war has taught us that safety within our borders does not protect us from outside dangers; our defense against tuberculosis is intimately bound up with the defense made by other nations.

The tuberculosis problem has been whittled down to a measurable size. With measurable funds and effort, we can come to grips with it confidently, in the whole nation. We should not be satisfied with Frost's slightly favorable biological balance. Extermination should be our goal.

The finding of cases will create facilities for their care: hospital sanatoria, work colonies for the older patients with chronic disease, financial aid for the tuberculous bread-winner all are needed. The protection of the healthy population and the proper use of treatment facilities require the development of some system whereby these cases can be isolated in a humane way.

It is in the local communities, in the individual home, that tuberculosis occurs; it is there that the problems must be met. Local health agencies, official and voluntary, would coördinate all available community resources, working closely with local medical profession and welfare groups whose help will be needed to the fullest.

The importance of team-work among all responsible groups is accentuated by the shortage of sanatorium beds in many parts of the country, wartime restrictions on new construction and the even more acute shortage of medical, nursing and other personnel in hospitals, health services and private practice.

OBJECTIVES OF A PROGRAM TO ERADICATE TUBERCULOSIS

To achieve our final objective, our immediate aims must be definite and specific. The essentials of a good tuberculosis program can be summarized briefly:

1. X-ray examination for the entire population, concentrating first on the vulnerable groups and their family contacts. This does not exclude the use of pre-X-ray tuberculin testing among selected groups with low infection rates.
2. Follow-up of every case discovered in X-ray examinations, in order to insure clinical diagnosis and proper treatment. This would include supervision by physicians in private offices or clinics, assisted by public health nurses; sanatorium care, protective supervision after discharge and rehabilitation where indicated.
3. Periodic examination, including chest X-ray films, of persons with inactive disease.
4. Prompt treatment for active cases which can make a good recovery.
5. Strict isolation of open cases to prevent further spread of the disease.
6. Intensified health education activities among the general population, patients and their families.
7. Expanded research in tuberculosis and control methods.

Finally, all of us who so ardently desire to see tuberculosis banished from our land must recognize that this cannot be done unless some financial provision is made for the tuberculous bread-winner, who must leave his family without adequate resources if he, himself, is to give up his job after treatment. We know that sickness breeds poverty, as poverty breeds sickness. The path of the tuberculosis patient is like that of one lost in an Arctic storm; he travels in a vicious circle of poverty and disease. Somewhere the circle must be broken, and the path made straight and upward—to health and economic independence.

Only if we recognize tuberculosis in all its aspects as an unnecessary cause of suffering and death, and treat it medically, socially and economically, shall we be able to conquer it. The outlook for control is encouraging, the future bright with hope. But as tuberculosis is the people's problem, its solution depends on the people's active willing coöperation. Nineteen-hundred and forty-four may well be the "year of decision" which determines the fate of the tubercle bacillus in the United States. The American people now have the opportunity to decide whether tuberculosis shall continue a needless and costly burden on the nation, or shall be exterminated. I am confident that, with the leadership of the National Tuberculosis Association, the decision will be against our common enemy.

SUMMARY

The outlook for the conquest of tuberculosis in the United States is encouraging. Technical developments have made it possible to find cases cheaply and to find them early. The war, which has threatened the stability of our civilization, with consequent lowering of resistance to the disease, has awakened public interest in tuberculosis control.

The Public Health Service has taken steps to prevent a wartime rise in tuberculosis. Mobile small film X-ray units have conducted mass case-finding surveys among workers in war industries—the most vulnerable group in the population. Routine X-ray examinations were instituted at United States Coast Guard training stations. Both the Army and the Navy included chest X-ray films in their examinations of all recruits.

Nearly three-quarters of a million persons—war workers and their families—have been examined by the U. S. Public Health Service, more than one in every 100 (1.3 per cent) have shown evidence of reinfection tuberculosis. Sixty-two per cent of the cases discovered are in the minimal stage when recovery is almost certain with good care. Thirty-one per cent of the cases are moderately advanced and 7 per cent far advanced. This is almost a complete reversal of past experience, when not more than 10 per cent of the patients coming to treatment for the first time were in the early stage of their illness. The discovery of a million cases of tuberculosis will not alter the course of the disease in this country, however, unless the cases discovered receive needed care to prevent further spread.

Of nearly 60,000 persons who die of tuberculosis every year in the United States, about half are in the most productive years of life. Tuberculosis is seventh among

the important causes of death in the general population; first, except accidents, among young adults, fifteen to thirty-five; second among the colored population, all ages; and from third to sixth among Spanish, Indian and Negro races. In industry, tuberculosis kills seven times more frequently among unskilled workers than among professional groups. No plan to rid America of tuberculosis can overlook the close alliance of poverty and this disease.

About 130,000 young men and women have been rejected at the examining and induction stations of the armed forces. The Public Health Service has coöperated with the armed forces in bringing these rejectees to the attention of their State Health Departments for follow-up and treatment. About one-third of the many tuberculous veterans of World War II who enter veterans' hospitals leave in a few weeks' time and return to their home communities, where they become a public health problem.

Now that we realize the tuberculosis problem in every part of the country, public and private agencies need to work side by side in a joint enterprise, utilizing joint resources, under the stimulus of a national program. The foundations for such a program have been laid by the National Tuberculosis Association, the Public Health Service and the State health authorities.

In a national program, the accepted pattern of Federal assistance to States would be applied under a specific authorization of funds by the Congress. State health authorities in turn would take the leadership in the establishment and support of tuberculosis control programs in local health departments. Local health agencies, official and voluntary, would coördinate all available community resources, working closely with local medical profession and welfare groups whose help will be needed to the fullest.

The essentials of an effective tuberculsosis program for the nation can be summarized briefly:

1. X-ray examination for the entire population.
2. Follow-up of every case discovered in X-ray examinations.
3. Periodic examination, including chest X-ray examination, of persons with inactive disease.
4. Prompt treatment for patients with active disease who can make a good recovery.
5. Strict isolation of open cases to prevent further spread of the disease.
6. Intensified health education activities among the general population, patients and their families.
7. Expanded research in tuberculosis and control methods.
8. Financial aid to the tuberculous bread-winner.

SUMARIO

En los Estados Unidos las esperanzas de conquistar la tuberculosis son en verdad alentadoras. Los adelantos técnicos ya nos permiten descubrir los casos en forma ecónomica y descubrirlos tempranamente. La guerra que ha amenazado la estabilidad de nuestra civilización, con la consiguiente disminución de la resistencia a la enfermedad ha avivado el interés público en la lucha antituberculosa.

El Servicio de Sanidad Pública ya ha dado pasos para impedir un ascenso de la dolencia durante la guerra. Por medio de unidades roentgenológicas movibles previstas de películas pequeñas, se han llevado a cabo encuestas colectivas entre los obreros de las industrias de guerra, que constituyen el grupo más vulnerable de la población. También se han iniciado exámenes roentgenológicos en las estaciones de adiestramiento de los guardacostas. Tanto el Ejército como la Marina han agregado el requisito de las películas torácicas en sus exámenes de todos los reclutas.

Casi tres cuartas partes de un millón de personas que trabajan en materias relacionadas con la guerra y sus familias, han sido examinadas por el Servicio de Sanidad Pública de Estados Unidos y más de una en cada 100 (1.3%) ha revelado signos de tuberculosis tipo reinfección. Un 62% de los casos descubiertos se encuentran aún en la etapa mínima en que la reposición es casi segura si la asistencia es buena. Un 31% de los casos son moderadamente avanzados y 7% muy avanzados, lo cual constituye casi lo contrario completamente de lo observado en el pasado en que no más de 10% de los enfermos que se presentaban para tratamiento por primera vez se encontraban en el período temprano del mal. Sin embargo, el descubrimiento de un millón de casos de tuberculosis no alterará la evolución de la enfermedad en el país a menos que los casos descubiertos reciban el cuidado necesario para impedir la propagación.

De casi 60,000 personas que mueren cada año en los Estados Unidos aproximadamente la mitad se encuentran en la época más productiva de la vida. La tuberculosis ocupa el séptimo lugar entre las más importantes causas de mortalidad en la población general; el primero, exceptuando accidentes, en los adultos jóvenes de 15 a 35 años de edad; el segundo entre la población de color de todas edades; y del tercero al sexto entre las razas de habla española e indios y negros. En la industria la tuberculosis es siete veces más mortífera para los obreros no adiestrados que entre los grupos profesionales. Ningún plan que se proponga desembarazar a América de la tuberculosis puede pasar por alto la íntima alianza entre la pobreza y el mal.

Unos 130,000 jóvenes de ambos sexos han sido rechazados por tuberculosis en las estaciones de examen y de ingreso de las fuerzas armadas. El Servicio de Sanidad Pública ha cooperado con dichas fuerzas a fin de poner sobre aviso a los departamentos de Sanidad de los Estados acerca de esos individuos para que reciban tratamiento. Aproximadamente la tercera parte de los muchos veteranos tuberculosos de la Segunda Guerra Mundial que ingresan en los hospitales de veteranos, los abandonan a las pocas semanas para volver a sus antiguos lugares de residencia en los que se convierten en un problema sanitario. Ahora que ya nos damos cuenta del problema tuberculoso en todas partes del país, los organismos públicos y privados tienen que combinar los recursos colectivos bajo el estímulo de un plan nacional. Las bases para ese plan han sido ya establecidas por la Asociación Nacional de Tuberculosis, el Servicio de Sanidad Pública y las autoridades de sanidad de los Estados.

En un plan nacional regiría el molde ya aceptado de ayuda federal a los Estados con los fondos concedidos por el Congreso. Las autoridades de los Estados a su vez se encargarían de establecer y sostener la lucha antituberculosa en los

departamentos locales de sanidad. Los organismos locales tanto oficiales como voluntarios coordinarían todos los recursos disponibles en cada colectividad, trabajando íntimamente con la profesión médica así como con los grupos cívicos cuyo concurso se necesita en grado máximo.

Los principios esenciales para una obra antituberculosa eficaz en escala nacional pueden sumarizarse sucintamente:

1. Examen roentgenológico de toda la población.
2. Observación subsecuente de todo caso descubierto en los exámenes roentgenológicos.
3. Exámenes periódicos, incluso roentgenológicos, de las personas con enfermedad inactiva.
4. Rápido tratamiento de los enfermos con enfermedad activa que puedan reponerse fácilmente.
5. Rígido aislamiento de los casos abiertos para impedir la propagación ulterior del mal.
6. Intensificación de las obras de educación sanitaria entre la población general y los enfermos y sus familias.
7. Expansión de las investigaciones y de los métodos de lucha.
8. Ayuda económica al trabajador tuberculoso.

THE PROBLEM OF THE TUBERCULOUS VETERAN[1]

LOUIS I. DUBLIN[2]

The purpose of this brief paper is to bring to the attention of workers in the field of tuberculosis a situation which, strangely enough, has escaped their observation for the most part. I have in mind the failure of the Federal Government's effort to restore the tuberculous veterans of World War I to health and to economic well-being. The Government and the people certainly intended to serve the tuberculous veteran well. The chief purpose of the Veterans Administration was to rehabilitate the disabled veteran. But in spite of huge expenditures of money and of effort, the program has essentially failed. To make matters worse, this failure has constituted a menace to the general public welfare. For the large numbers of open cases of tuberculosis among veterans, under the loosest kind of supervision and control, have spread infection not only to their immediate families but to the larger circle of civilians with whom they have been in contact for longer or for shorter periods. If this pressing problem were solved, it would prove a major step in the national program for the eradication of tuberculosis.

Let us review the development of the Federal effort for veterans suffering from tuberculosis. During and immediately after the first World War, many active cases were discovered among our military personnel and veterans and their care was entrusted to the newly organized Veterans' Bureau. Many hospitals and sanatoria were erected for their treatment and this service became a major activity of the Bureau and of its successor, the Veterans Administration. As early as 1923, there were 23,653 veterans with tuberculosis admitted in a single year for treatment in veterans' hospitals or other Federal agencies. At first, care was given only to those whose disease was connected with their military service; but, subsequently, those whose disease was non-service-connected also became eligible for treatment. As a result, the number of admissions has continued large. After a quarter of a century, the annual admissions of tuberculous veterans, excluding those of the present war, still number close to 8,000. Including the new veterans, the figure for the latest fiscal year for which we have figures is nearly 10,000. For the entire period from 1919 to 1943, admissions of veterans for tuberculosis to Federal and other hospitals have exceeded 300,000. This figure represents about 200,000 different people.

No effort was spared in erecting hospitals of the latest type with excellent equipment and with as good medical personnel as could be obtained. In June, 1943, 5,671 beds were available for tuberculous patients. To meet the influx of World War II cases, additions are planned to provide a total bed capacity of

[1] Presented in the symposium on *Tuberculosis and War* at a joint session of the Medical and Public Health Sections at the 40th annual meeting of the National Tuberculosis Association, Chicago, Illinois, May 12, 1944.

[2] Second Vice-President and Statistician, Metropolitan Life Insurance Company, New York, New York.

about 7,000 by next year. The Government pays all of the costs of hospitalization and transportation and in addition pays the veterans a disability benefit. Veterans with service-connected disability resulting from active pulmonary disease receive from $70 to $100 per month, depending upon the degree of disability. Those with non-service-connected disability receive $40 per month if totally and permanently disabled. However, those without dependents receive a much smaller payment during hospitalization—$20 in service-connected cases and $8 in non-service-connected cases. For men who are treated at home, there is available an additional payment of $50 per month to the wife or other person attending the patient. In my judgment, these money benefits provide an incentive to many patients to discontinue their hospital treatment and to attempt their cure at home.

As I have indicated, the experience of the Government hospitals with tuberculous veterans has been strikingly unfavorable. Thus, in 1943, of the more than 10,000 cases discharged, only 2.3 per cent were designated arrested at discharge; and only 0.7 per cent apparently arrested. In other words, only 3 per cent of the patients discharged during the year were medically rehabilitated. The remainder of the cases were discharged either as quiescent, improved, unimproved, dead, or condition not stated. The vast majority of the patients discharged were clearly not ready to be released to civilian life. The most disturbing fact in the picture is that a large proportion of the discharged patients leave without authorization or consent. Thus, the Veterans Administration last year itself classified the hospitalization of 58 per cent of the discharged cases as incomplete.

One must admit at once that exact comparisons between various sanatoria as to results of treatment cannot be made. Nevertheless, having in mind the relatively high average age of tuberculous veterans and other adverse factors, the fact remains that the results obtained in Veterans Administration Hospitals are far inferior to those recorded year after year in well managed state, municipal and private sanatoria. This situation in the Veterans' Hospitals cannot be justified or explained away. Many sanatoria do ten times as well.

What are the reasons for this difference? The chief difficulty, in my judgment, has been the lack of appreciation on the part of Congress and of others interested in veterans' welfare, of certain fundamental conditions necessary for the effective treatment of tuberculosis. Outside pressure was brought to bear to liberalize financial provisions for these veterans. As we have seen, these provisions constitute a monetary incentive for discontinuing hospital treatment, since larger benefits are paid to many patients when they take their treatment at home. What makes matters worse is the virtual lack of control over the patients. They are not subject to the usual type of hospital restrictions. They may come and go almost at will, irrespective of their condition and against medical advice. Six to eight admissions of the same patient are a frequent occurrence in spite of attempts to control this situation. The type of discipline that is so essential for the successful treatment of the tuberculous patient is absent, for the most part, in Veterans' Hospitals. The net result of all this has been to undermine the morale of the veterans and of the doctors serving in Veterans' Hospitals.

The thousands of men who leave the Federal sanatoria before they are cured endanger the health of their families and their communities. Large numbers of them live at home, for longer or shorter periods, under little or no medical supervision. Traditionally, these tuberculous veterans have been looked upon as wards of the Federal Government and, as a result, local and state health officers have taken little responsibility for them. The patients, therefore, who fail to receive effective care from the Veterans Administration often do not receive the benefits of care in institutions operated by their own state or local governments. These men constitute an army of discouraged men who are among the important centres of tuberculous infection in their home communities.

At this late date, I question whether very much can be accomplished for World War I veterans. I am, however, genuinely disturbed over the fact that a new and large crop of tuberculous veterans is emerging from the present war. Already several thousand young veterans with tuberculosis have been admitted to Veterans' Hospitals. From present indications, there is a distinct danger that the Veterans Administration will function under the same regulations and procedures which governed the care of veterans of World War I. Evidence at hand indicates that the new veterans are showing the same restlessness and the same abandonment of regular hospital care which has produced such calamitous results among the older men. More than half of the younger veterans discharged have left against medical advice. The stage may be set for another great medical tragedy; and unless drastic action is taken, I believe that lack of discipline and mistaken generosity may not only take their toll of these young men but may also seriously delay our control of tuberculosis in the general population of the country.

We should be able to avoid such a tragedy. The present situation is far more favorable than it was during the last war and immediately thereafter. We now have at our disposal excellent medical facilities and improved skills and treatment. The new crop of tuberculous veterans is more apt to be in the early stage of the disease when the prospect for cure is usually best. There is no good reason why in many areas these young veterans should not be cared for near their own homes in state and county sanatoria which meet the proper standards for treatment of the disease. Thousands of beds are vacant and available in excellent institutions. The Veterans Administration should erect new facilities only where it is absolutely necessary to do so.

Even more important, the time is ripe for a careful revision of the basic law under which the Veterans Administration operates. The monetary incentives which have worked havoc with care of the men in tuberculosis hospitals should certainly be removed. The regulations affecting these veterans should also be changed. If the program is to be effective, tuberculous veterans must undergo hospitalization until they are restored to health or are in a safe condition to be discharged. If they will not remain in Federal hospitals, local health authorities must be promptly notified and encouraged to exercise the control over these men which the public health laws give them. Where such laws are weak, they should be strengthened. Whatever steps are necessary must be taken by health

officers to provide supervision and treatment in their own institutions for recalcitrant veterans with active tuberculosis, just as for others with the disease.

The outlook is not altogether black. The Veterans Administration and the American Legion are both aware of the seriousness of the present situation and are eager to coöperate with the state and local health officers in a well considered plan to help veterans toward rehabilitation and to protect the families of the men from infection. The American Legion is particularly anxious to help educate the men in the hospitals to take advantage of the care which is made available to them and to stay until their disease is checked. A national program has already been launched through the many local posts to further this campaign. But above and beyond all this, it is essential that a careful study be made of the operations of the Veterans' Hospitals to see on the spot the character of the service rendered in them and the conditions which must be remedied to make these institutions attractive to veterans.

Such study should cover the medical administration, the facilities for occupational therapy, the program for vocational rehabilitation and all the other elements in the program, in order to see what else may be required to help in the rehabilitation of tuberculous veterans under Federal auspices. The medical profession and the public are now sufficiently aroused to the situation regarding tuberculous veterans so that they will not be content until the Veterans' Hospitals produce results at least commensurate with the generous public provision for these institutions and which are comparable to the splendid showing of so many public and private sanatoria for the care of the tuberculous.

SUMMARY

Federal efforts to care for the tuberculous veterans of World War I have failed to restore these men to health and, unless radical changes are made in the present set-up and procedure, the same fate will be suffered by the tuberculous veterans of the present war.

More than 200,000 veterans of the first World War have been admitted for treatment of tuberculosis to hospitals and sanatoria operated by the Veterans Administration in the past twenty-five years. Even now approximately 7,000 such veterans of the last war are admitted each year for treatment. With few exceptions, these veterans do not get well. This is in sharp contrast with the much more favorable record over the same period for the tuberculous entering state, county and private sanatoria. This unfortunate condition arises primarily from the fact that the medical staff of the Veterans' Hospitals cannot exercise the necessary control over their patients. The good discipline essential to the care of the tuberculous is almost altogether absent in these hospitals. As a result, the physical condition of the patients deteriorates and the veteran too often goes home against medical advice where he can readily become a menace to the members of his family and to others in his community. The lack of discipline in Veterans' Hospitals is encouraged by the legislation in force which puts a financial premium on discontinuing treatment at the hospitals. Congressional legislation provided generous benefits but not the necessary safeguards. Public

interest requires that this legislation be revised to provide such safeguards in the care of tuberculous veterans as would protect these men and their families.

Because our armed forces are now three times as large as in the last war, tuberculous veterans of this war may eventually far outnumber those of the last. It would be well-nigh criminal to permit these new veterans to experience the same failure which veterans of the first World War suffered.

SUMARIO

Los esfuerzos realizados por el Gobierno Federal para atender a los veteranos tuberculosos de la Primera Guerra Mundial no han devuelto la salud a esos individuos, y a menos que se introduzcan cambios radicales en la actual organización y administración, va a suceder lo mismo a los veteranos tuberculosos de la guerra actual.

Durante los últimos 25 años se han recibido más de 200,000 veteranos de la Primera Guerra Mundial, para tratamiento de su tuberculosis en los hospitales y sanatorios a cargo de la Administración de Veteranos, y hoy en día se reciben cada año unos 7,000. Con muy pocas excepciones, esos veteranos no se reponen, lo cual se encuentra en decidida contraposición al resultado mucho más favorable obtenido durante el mismo período en los tuberculosos que ingresan en los sanatorios estatales, distritales y particulares.

Esa situación lamentable tiene por causa principal el hecho de que el claustro médico de los hospitales de veteranos no puede ejercer el influjo necesario sobre dichos enfermos, de manera que en esos hospitales brilla casi por completo por su ausencia la disciplina que es tan esencial en la asistencia de la tuberculosis. A consecuencia de esto el estado físico de los enfermos deteriora y el veterano con demasiada frecuencia regresa a su hogar en oposición al consejo médico, pudiendo allí fácilmente convertirse en un peligro para sus familiares y las demás personas de su colectividad.

Esa falta de disciplina en los hospitales para veteranos encuentra apoyo en la legislación vigente que casi ofrece una recompensa económica por el abandono del tratamiento hospitalario.

La legislación federal se ha mostrado generosa en sus beneficios, pero sin crear las salvaguardias necesarias. El interés público exige que esa legislación sea revisada, a fin de establecer en la asistencia de los veteranos tuberculosos salvaguardias que protejan tanto a éstos como a sus familias.

Como nuestras fuerzas armadas son hoy día tres veces mayores que en la última guerra, los veteranos tuberculosos pueden con el tiempo superar con mucho a los de la otra, y sería casi criminal permitir que esos veteranos nuevos experimentasen el mismo contratiempo que sufrieron sus compañeros de la Primera Guerra Mundial.

THE TUBERCULOSIS PROGRAM OF THE VETERANS ADMINISTRATION[1]

ROY A. WOLFORD[2]

THE TUBERCULOSIS SITUATION FOUR YEARS AFTER THE ARMISTICE

The peak load for hospitalized tuberculous beneficiaries was reached during 1922. A total of 44,591 tuberculous patients were treated in hospitals during the fiscal year 1922 at the largest yearly cost of almost $30,000,000.00. The number of government beds then available was grossly inadequate and, in order to give hospital care to the disabled men and women, contracts were made with civil and state institutions.

At that time only persons with service-connected disabilities could be hospitalized for treatment. The average hospital stay was about seventy-six days. That year over 26 per cent of the hospital discharges of tuberculous patients were against medical advice or because of absence without official permission or for disciplinary reasons.

The accredited number of persons in military service during World War I was 4,757,240. By June 30, 1922, less than four years after the armistice, compensation for service-connected tuberculosis had been granted to almost one of every 130, or a total of 36,000 living veterans who had served in that conflict.

THE CASE LOAD OF TUBERCULOUS VETERANS PRIOR TO PEARL HARBOR

By the close of the fiscal year 1941, the tuberculosis hospital load had reached its lowest ebb. Exactly 14,681 tuberculosis cases were under treatment during that year, which proved to be the last fiscal period preceding the sneak attack on Pearl Harbor. The tuberculosis disability of only about 17 per cent of these veterans was service-connected. There were then remaining in all hospitals under treatment for tuberculosis 4,637 veterans or 8 per cent of the total hospital load for all types of disability, compared with 43 per cent in 1922. It is interesting to note that, although the Spanish American War had been terminated over forty years before, there were 107 veterans of that war under treatment for tuberculosis at the end of the fiscal year 1941.

During the fiscal year 1941, the average length of stay for a tuberculosis patient was one hundred and eighty-eight days, a decided improvement over the seventy-six day average in 1922.

Of the total World War compensation service-connected active disability awards being paid as of June 30, 1941, over 15 per cent, or 53,859, were for tuberculosis as the major disability.

[1] Presented in the symposium on *Tuberculosis and War* at a joint session of the Medical and Public Health Sections at the 40th annual meeting of the National Tuberculosis Association, Chicago, Illinois, May 12, 1944.

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In addition, 10,135 World War veterans were receiving pension for non-service-connected tuberculosis.

Approximately 85 per cent of the disability awards for service-connected tuberculosis in 1941 were being paid for arrested tuberculosis. This would indicate, although many of our patients leave the hospital before we can properly classify their condition as arrested, that the great majority of the veterans receiving compensation for service-connected tuberculosis have attained an arrest of their pulmonary condition; and the ultimate results can be classified as good.

As of June 30, 1941, death claims had been paid to the widows and dependents of approximately 48,330 deceased tuberculous World War veterans. Roughly, within a period of twenty-three and one-half years one veteran, alive or deceased, of every 42 individuals who served in the World War was known to have suffered with tuberculosis of a compensable or pensionable degree.

Miller (1) reports that in a study of deaths among Canadian pensioners of the first World War, published by the Department of Pensions and National Health in 1939, of the 600,000 men who enlisted in the service, eventually 8,500 were pensioned for tuberculosis and 3,000 had died from the disease. He summarized the findings of the study by the pointed observation that, for every 100 men killed in action, 6 died from tuberculosis and, for each 100 pensioned for wounds, 25 were pensioned for tuberculosis.

The intensive study of veterans after the first World War constituted, prior to the present conflict, the greatest mass survey in history. It played no small part in the tuberculosis control program of the entire country. For the twenty-year period, 1924 to 1943 inclusive, there were almost 22,000,000 individual outpatient medical examinations conducted and over 2,250,000 separate admissions of veterans for hospital and domiciliary care, in which complete physical examinations and, in many instances, roentgenograms of the chest were required.

THE PROBLEM PRESENTED BY THE NATIONAL EMERGENCY AND WORLD WAR II

With the development of the national emergency and preparedness for strong defense, the Veterans Administration was confronted with the problem of relinquishing beds for its beneficiaries in military and naval hospitals.

After Pearl Harbor, the necessity of shifting the calculations from a national defense basis to a war footing arose.

In estimating the potential future load of tuberculous beneficiaries many intangible factors must be considered. Those relating to the armed forces are, briefly:

(a) The eventual numerical strength of the armed forces.
(b) The duration of the war.
(c) The theatres of operation for the armed forces.
(d) The character of the major offensive, that is, aerial, naval or land.
(e) The physical standards required for induction and enlistment.
(f) The extent of inclusion of women for service in the armed forces and the scope of their assignment overseas.

The war-disabled rightfully enjoy a special status and deserve the fullest possible aid. Our obligation to them has already been recognized and plans for their care are well developed. The terms of future legislation for their benefit, that the Congress may enact, will bear materially on the ultimate case-load of the Veterans Administration. Demobilization should not be too rapid. It should be sufficiently prolonged as to permit the careful examination, including chest X-ray films, of all mustered out service men and women and the definite determination of the service-incurrence or aggravation of such disablements as are found at discharge.

During the days since the first World War a tuberculous veteran had small chance of competing for employment in industry. An interesting change has taken place since Pearl Harbor. Many tuberculous veterans with advanced disease, definitely disabled and having considerable functional impairment but in the quiescent stage, are now engaged in some form of useful occupational pursuit, incident to the war effort.

We must expect and prepare for a marked increase in our present hospital load of World War I and peacetime beneficiaries when conversion of war industry to peacetime activities is in full swing, unless industry is properly familiarized with the place which these tuberculous veterans can take in a planned postwar economy. The dependency of many of them, now gainfully employed and able to find employment for themselves, on the Veterans Administration for medical care and hospitalization will again present itself and will have to be met along with the increased responsibilities for care and treatment of World War II beneficiaries.

In the building of new hospitals and additions to existing facilities, the shift of the veteran population to war industries in specific industrial areas must be taken into account, as must the trend to settle permanently in these localities be measured.

The Office of the Surgeon General, War Department, reports (2) a hospital admission rate for tuberculosis in the continental United States, for the six-month period July to December, 1943, of 1.1 per thousand, while, for the comparable six months in 1941, this hospital admission rate was 2.0 per thousand. The average admission rate for the Army in the continental United States during the first World War, based on the monthly admission rates from April, 1917 to December, 1919, was 13.0 per thousand, or twelve times that in Army hospitals for tuberculosis in the last six months of the calendar year 1943. This is a tangible fact, and if this were the only factor to be considered—we are not so naive as to believe that it is—even though the eventual strength of the armed forces in the present conflict may approximate three times the size of the Army and the Navy in World War I, should the present low average hospital admission rate be maintained in military hospitals during the subsequent months of the war, the immediate tuberculosis problem of the Veterans Administration would be but one-fourth as great as was the problem after the first World War. This is specific evidence of the value of the detection of tuberculosis by the chest X-ray study of all persons before entrance into the Service.

ACTION TAKEN TO MEET THE PROBLEM

Recognizing that uninterrupted direction is essential in the treatment of tuberculosis and other disablements as well, if satisfactory results are to be obtained, the Veterans Administration early in the present emergency perfected arrangements to accept from the Army for direct admission to our facilities, coincident with separation from the Service, all disabled soldiers requiring further hospitalization who were being discharged for disability incurred in line of duty. On the enactment of liberalizing legislation on March 17, 1943, this procedure was extended to include as well the "*not* in line of duty cases" being discharged. Subsequently, a similar agreement was made by the Veterans Administration with the Navy, except that only those being separated by medical survey who desire further treatment in Veterans Administration Hospitals are admitted direct to our hospitals from this source. Recently, this later arrangement has been completed with the Coast Guard, so that continuity of treatment is available to all veterans of World War II, regardless of the service-incurrence of their disability, if they choose to avail themselves of that privilege. It is felt the present procedure of admission of these World War II tuberculous veterans direct to Veterans Administration Hospitals by transfer from the armed forces, will prove to be the more effective plan in the eventual arrest of their tuberculous process than would any program that permits the discharge of the tuberculous soldier or sailor to his home community, and which places the responsibility of his ultimate hospitalization in the hands of the individual veteran. While it is realized this procedure adversely affects our ratio of irregular discharges and for this reason statistically affords material for unfavorable criticism, it is believed it gives the discharged disabled veteran definite first-hand knowledge of the benefits to which he is entitled as a beneficiary of the Veterans Administration, and from the public health standpoint maintains control of the tuberculous veteran to the farthest point to which it can be held without individual state action.

As tuberculosis beds have been required for the veterans of World War II, one general hospital has been converted to a tuberculosis hospital and wards for general patients in tuberculosis hospitals have been changed to permit utilization for tuberculous patients. Construction changes at several tuberculosis hospitals resulted in the establishment of a number of new beds through better employment of existing space. As of March 31, 1944, the total tuberculosis beds have been increased to 7,196, with 5,326 located in thirteen tuberculosis hospitals and 1,870 in tuberculosis departments of twenty-six general hospitals. By the end of the calendar year 1944 there will be about 8,000 tuberculosis beds in operation.

The tuberculous beneficiaries so far received from the armed forces differ somewhat from our World War I group of patients. Their educational level is higher and their psychological reaction to the disease brighter. It is expected, among other things, that it will be necessary to broaden the availability of some of our present methods of treatment. This is particularly true of our surgical collapse therapy program.

At one of our chest surgery centres over 70 per cent of the younger beneficiaries of World War II are receiving surgical collapse therapy. Consequently, we anticipate a considerable increase in our chest surgery program as a result of the admission of new beneficiaries being discharged from the present conflict.

From a nucleus of eight chest surgery centres established in as many geographical areas of the country in 1935, facilities for major thoracic surgery have recently been extended to eight other tuberculosis hospitals. Eventually it is expected these facilities will be available at all our tuberculosis hospitals and at those general hospitals maintaining sizeable departments for the continued treatment of tuberculosis.

To care properly for psychotic beneficiaries of World War II who are also suffering with active pulmonary tuberculosis, units of approximately 150 beds each are being established at ten neuropsychiatric hospitals. These tuberculosis-neuropsychiatric units are being equipped to render the standard tuberculosis sanatorium regimen in conjunction with the specialized treatment of the concomitant psychosis, and will include the facilities for the simpler forms of collapse therapy, such as pneumothorax, pneumoperitoneum, etc. At four of the neuropsychiatric hospitals it is planned to equip and staff the tuberculosis units for utilization as chest surgery centres for tuberculous psychotic male and female patients.

As an aftermath of the first World War, impetus was given to diversional therapy for the tuberculous patient through the general inclusion of occupational therapy and bibliotherapy in the sanatorium regimen. In the present war period increased emphasis is being placed on early rehabilitation of the disabled individual, regardless of whether his handicap has been contracted in the armed forces or in industry. Among our younger veterans there is an insistent demand for diversional activities that will be of some future use to the patient, or will prove of benefit to him in his educational program. The world of radio and global warfare has broadened the horizon and widened the interests of the men serving in the present conflict. To meet these new interests, occupational therapy aides to teach commercial and academic subjects are being placed on duty as qualified appointees can be found.

Before World War I, hospital library work had meant the medical library solely, but the work as now carried on means not only the medical library but a well administered central library room for patients and personnel and direct service to the ward patients unable to go to the central library. The popular books of the month, as they come off the press and are available for review, are being constantly added to the library shelves for selective reading by the patient body. The late titles in electronics and others of the newer sciences have been catalogued and placed in circulation. World War II patients are quite interested in vocational training and are doing much reading on the different fields of work in order to decide what they wish to study when they become physically able. This interest holds many to remain in the hospital until they become arrested, whereas they had planned to leave against medical advice.

Attention is focused on current world developments through the medium of

the radio head phones at the bedside of each patient, which are connected to the centrally operated hospital receiving set.

News events and the world of sport, travelogues and the latest releases from Hollywood, are presented in the facility theatre twice or three times weekly. Short subjects with sound, that are not too tiring, are shown at the bedside of infirmary patients at some of our hospitals through the use of the 16 mm. machine. Facility newspapers operated by the patients as an occupational therapy project provide some patients with diversional therapy.

Occupational therapy, graduated exercises, recreation and bibliotherapy are graduated to the individual patient's tolerance. A closer coördination of these methods of therapy and medical rehabilitation is being planned, thus making possible by prompt liaison with the vocational adviser the selection of a vocational objective early in the hospitalization period of those feasible for rehabilitation.

Our chief concern is to exercise care in properly safeguarding the activities of the younger patients in recreation and occupational therapy, so that they do not extend themselves beyond their tolerance and thus repeat one of the mistakes of our sanatorium regimen after World War I.

MEASURES TO INDUCE THE YOUNGER VETERANS TO CONTINUE HOSPITAL TREATMENT

The Veterans Administration, at the beginning of the present emergency, became cognizant (as was observed after World War I) of the reaction to freedom from restraint following release from the military and naval services, which was evidenced by the high percentage of irregular discharges among the younger veterans of World War II, particularly the tuberculous beneficiaries when hospitalized in our facilities after discharge from the armed forces. During the twelve-month period ending June 30, 1942, over 67 per cent of the first 300 discharges of World War II tuberculous veterans were against medical advice, absent without official permission or for disciplinary reasons. This was a matter of deep concern. An intensification of our intramural educational program was effected and a resurvey of our public health and social work procedures instituted. It has been our experience that, in those states where the local public health and welfare agencies are more efficiently organized and the coöperation of the Veterans Administration Facilities and these agencies more effectively applied, the handling of patients who interrupt their treatment while still open and communicable cases does not constitute a problem. The Veterans Administration Facilities systematically and immediately report persons found in the course of outpatient or hospital examinations to have tuberculosis, and persons discharged with active tuberculosis in any form, to their own State Health Department for transmission to the appropriate County Health Department in the case of State residents and the appropriate State Health Department in the case of nonresidents.

Unfortunately, many states have indicated that not all of their County Health Departments are equipped to use these reports to advantage, that is, they do not have the personnel or funds to interpret to the members of the household their

urgent need for physical examinations or to offer them such, nor can they maintain supervision of veterans discharged with active tuberculosis. Undoubtedly, in some areas the tuberculous veterans living at home are regarded as the responsibility of the Veterans Administration solely. It should be remembered that veterans, whether their disabilities are service-connected or non-service-connected, are citizens of the community in which they are resident, and, as such, eligible and entitled to the same services from the Public Health Department as other residents of the community. They should likewise be amenable to the same regulatory restrictions in communicable diseases as are applied to non-veterans by the local public health authorities. Similar measures to insure adherence to health regulations should be invoked with recalcitrant tuberculous veterans as with other citizens. Every effort should be expended to impress on the war disabled, suffering with active tuberculosis, the necessity of continuing indicated medical treatment until maximum benefit has been attained.

Those hospitals where social workers have been assigned have been directed to supplement official reports with requests directed to local social and health agencies for the prompt examination of persons who may have been exposed to the disease and prompt medical and social supervision of patients who have been discharged with active tuberculosis, with a view to encouraging rehospitalization of the latter at the first opportunity.

Adequacy of the private social case work and health agencies of the home community to which the Veterans Administration's social worker can turn, which are in a position to give prompt response and collaboration, also greatly facilitates the effective meeting of acute social problems when they threaten to force the patient to leave the hospital. Whatever can be done to strengthen such local agencies and whatever encouragement can be given those agencies to include veterans among the groups which they serve, will permit more effective service to hospitalized veterans by Veterans Administration personnel.

The Army and the Navy are assisting materially and coöperating to the fullest extent with the Veterans Administration in impressing the soldier or sailor with the seriousness of his tuberculous disease and the necessity for early definitive treatment. Medical officers of the military and naval services have been instructed by their respective Surgeons General to use the weeks pending separation from the service as a period of essential education to the soldier or sailor. The necessity for continued treatment in the Veterans Administration Facility on his transfer there after discharge from the service until a complete arrest of the disease is attained, is being impressed upon the discharged service man or woman.

The United States Public Health Service has rendered effective assistance and, at its recent conference of State Health Officers, presented the subject of the adequacy of reporting methods as it relates to tuberculous veterans as one of the major topics for discussion.

The American Legion has actively embarked upon an educational campaign among its own members and members of its Auxiliary, to engender an intelligent and sympathetic understanding on the part of ex-service men and women in the

problems of the tuberculous veteran. Service officers of the Legion and interested workers of the American Legion Auxiliary receive instruction on tuberculosis and its control. The American Legion, early in its campaign, solicited the expert advice of the National Tuberculosis Association in formulating its program and in securing closer coöperation with state and local health authorities.

Other ex-service organizations and individuals interested in tuberculosis control have contributed their share in the awakening of an awareness to the need for concerted action. It is believed some results are discernible. During the twelve-month period ending June 30, 1943, 1,311 World War II tuberculous veterans were discharged from all hospitals, 61 per cent without the consent of the physician. By February, 1944, irregular discharges among these veterans of World War II had fallen to 50 per cent of all discharges. Of all World War II veterans suffering with tuberculosis, admitted to our hospital, almost 43 per cent were remaining under treatment on February 29, 1944. Less than 32 per cent of those admitted have left against medical advice or are absent without permission. The average length of hospital stay of World War II service-connected tuberculous veterans discharged since July, 1942 was one hundred and ten days, while for the month of February, 1944 the average length of hospital stay was one hundred and twenty-three days. Similarly, the stay in the hospital of non-service-connected World War II veterans has increased from forty-six days for all discharged from the hospital since July, 1942 to sixty-six days for those discharged during the month of February, 1944.

THE FUTURE OUTLOOK

There is every reason to believe the end results of the treatment of the tuberculous beneficiaries of World War II will be better than those attained in veterans after World War I. The Veterans Administration has trained personnel, many with over twenty years' experience in the many problems to be met. Its hospitals are well equipped, of modern fireproof construction, and manned by competent resident and consultant staffs. The public, through mass chest survey of industry and the armed forces, in conjunction with the intensive tuberculosis control and educational campaign that has been in progress in recent years, is more tuberculosis conscious and alive to the infectiousness of open cases of tuberculosis. There is a large veteran population that saw service in World War I and learned by the hard way, through personal experience, of the disappointments of interrupted sanatorium treatment after that war, who will lend encouragement to the younger veterans to continue uninterrupted treatment.

The technical advances in diagnostic methods and the advent of surgical collapse therapy will prove to the great advantage of the veterans of World War II. A more sympathetic attitude in the rehabilitation of the tuberculous by industry and the public in general, than after World War I, is manifest. A better understanding of the part that correction of the social and economic difficulties of tuberculous patients plays in the successful management of the prolonged treatment of these patients has been gained.

We believe that the public health control of the tuberculous veterans, their

education to continued treatment and their ultimate rehabilitation cannot be separated from the control, education and rehabilitation of the tuberculous nonveteran persons of the community. Any and all measures that can be applied must be directed to and for the tuberculosis population as a whole. There cannot be a veteran or a nonveteran approach to the problem. The scope of the control campaign must reach the smallest community units. Effective support through legislation and by privately donated funds or public appropriations must be given to insure adequate local, state and Federal tuberculosis control measures, to further the extension of present treatment facilities and to broaden established rehabilitation programs for all groups.

SUMMARY

The peak load for hospitalized tuberculous veteran beneficiaries was reached during 1922, when a total of 44,591 service-connected cases were treated in civil, state and Government institutions during that fiscal year, with the average hospital stay being approximately seventy-six days. Less than four years after the armistice one living veteran of every 130 who had served in the World War was receiving compensation for service-connected tuberculosis. By June 30, 1941, the tuberculosis hospital load, which had constituted 43 per cent of all patients remaining in the hospital at the close of the fiscal year 1922, had decreased to 8 per cent of the total hospital load for all types of disability. The average length of hospital stay in 1941 was one hundred and eighty-eight days. Tuberculosis was the main disability in over 15 per cent of the total World War compensation service-connected active disability awards on the rolls June 30, 1941; approximately 85 per cent of the awards for tuberculosis were being paid for arrested tuberculosis.

As of June 30, 1941, death claims had been paid to the widows and dependents of 48,330 deceased tuberculous World War veterans.

Roughly, within a period of nearly twenty-three and a half years, one veteran, alive or deceased, of every 42 persons who served in the World War was known to have suffered with tuberculosis of a compensable or pensionable degree.

The tuberculosis problem presented by World War II is discussed; the intangible factors which will affect the case load are outlined and the steps taken to meet the problem briefly sketched. Measures to induce the younger veterans to continue hospital treatment include an intensification of the intramural educational program and a broadening of the public health and social work procedures. The Army and Navy are impressing the soldier and sailor with the seriousness of his tuberculosis disease and the necessity for early definite treatment. The United States Public Health Service, ex-service organizations and individuals interested in tuberculosis control have contributed their share, as well, in the awakening of an awareness of the need for concentrated action. The discernible results are cited.

There is every reason to believe the end-results in the treatment of the tuberculous beneficiaries of World War II will be better than those attained in veterans after World War I.

The public health control of the tuberculous veterans, their education to continued treatment and their ultimate rehabilitation must be closely integrated with the general tuberculosis control program, the further extension of present treatment facilities and the broadening of established rehabilitation programs for all groups.

SUMARIO

La cúspide en el número de veteranos tuberculosos hospitalizados beneficiados por el Gobierno fué alcanzada en al año 1922, en que se trataron 44,591 enfermos en las instituciones civiles, estatales y federales, representando la permanencia media en el hospital unos 76 días. Menos de cuatro años después del Armisticio, un veterano de cada 130 vivos que habían servido en la Guerra Mundial, recibía indemnización por tuberculosis relacionada con su servicio militar. Para el 30 de junio, 1941, los enfermos en los hospitales para tuberculosos, que habían constituído el 43% de todos los hospitalizados al terminar el año ecónomico 1922, habían disminuído a 8% del total hospitalizado por toda clase de incapacidad. En 1941 la permanencia media en el hospital representó 188 días. La tuberculosis constituía la principal causa de incapacidad en más de 15% de todos los subsidios por incapacidad activa relacionada con el servicio militar durante la Guerra Mundial, para el 30 de junio, 1941; y aproximadamente 85% de las indemnizaciones por tuberculosis correspondía a la forma estacionada o detenida.

Para el 30 de junio, 1941, se habían satisfecho subsidios por muerte a las viudas y parientes de 48,330 veteranos tuberculosos de la Guerra Mundial que habían fallecido.

Toscamente, en un período de casi 23½ años, un veterano, ya vivo o muerto, de cada 42 que habían servido en la Guerra Mundial, había padecido de tuberculosis indemnizable o pensionable.

Discútese el problema tuberculoso planteado por la 2ª Guerra Mundial, bosquejándose los factores intangibles que afectarán el número de casos y las providencias tomadas para resolver el problema. Las medidas iniciadas para persuadir a los veteranos más jóvenes para que continúen el tratamiento en el hospital comprende intensificación del programa educativo en clases y ampliación de las obras sanitarias y sociológicas. El Ejército y la Marina están grabando en la mente de los soldados y de los marineros la gravedad que reviste su enfermedad tuberculosa y la necesidad de comenzar tratamiento completo temprano. El Servicio de Sanidad Pública, las sociedades de veteranos y los individuos interesados en la lucha antituberculosa están participando también en la creación de una comprensión mejor de la necesidad de lograr una acción concentrada. Cítanse los resultados que ya pueden observarse.

Hay, pues, buenos motivos para creer que los resultados definitivos en el tratamiento de los veteranos tuberculosos de la 2ª Guerra Mundial serán mejores que los obtenidos después de la 1ª.

La vigilancia sanitaria de los veteranos tuberculosos, su educación para que continúen el tratamiento y su rehabilitación definitiva, deben ser integramente enlazadas con la obra antituberculosa general, la extensión ulterior de los actuales

medios de tratamiento, y la ampliación del programa de rehabilitación establecido para todos los grupos.

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PROGRAM FOR TUBERCULOUS PATIENTS AMONG WORLD WAR II VETERANS[1]

T. O. KRAABEL[2]

A layman's approach to a medical problem is necessarily limited. The limitations to be recognized are imposed by the broad field of activity in which members of the medical profession dominate. In this scope are diagnosis, prescription, therapy, clinics, scientific management and care, control and medical decision and judgment. Pervading these phases is the human and personal element in which the patient himself and his lay well-wishers may join in stimulating the effectiveness of what doctors, public health officials, hospital heads and nurses determine to be professionally best not only for the afflicted one but also for his relatives and the community at large.

In one of its recent tracts on tuberculosis the National Tuberculosis Association sets forth how a balanced program for attacking this scourge might be carried out. It names four groups of society: medical profession, tuberculosis associations, tax-supported official agencies and volunteer agencies interested in public health and welfare.

The human side is definitely recognized in the observation that such a program is a coöperative effort, that neither official agencies nor volunteer groups have a monopoly on tuberculosis work and that the responsibility for tuberculosis control rests with the people. Dr. Philip P. Jacobs in his article on *Tuberculosis as a War Problem*, December, 1924, said: "The utilization of non-military and non-official voluntary agencies and institutions during and following the war for the treatment and prevention of tuberculosis is highly desirable and should be extended."

We are glad to number among the volunteer agencies the American Legion and the American Legion Auxiliary. The record of the two groups during the past quarter century demonstrates among other matters the close alliance which has been built up between the medical profession and the Legion in moving ahead against challenging situations of mutual interest. Physicians, surgeons and nurses who saw service in World War I have played a great part in the deliberations of the organization on programs for the disabled. As members themselves and as consultants and committee-men, they have brought to the two great activities of the Legion—rehabilitation and child welfare—the best and most modern advice and action the healing art has to offer. Many of them had suffered from tuberculosis, overcame the trouble and then exercised their talents and skill in combating the disease in others. We welcome the opportunity to show our sentiments by contributing what we can to the program of controlling and reducing the toll of tuberculosis among war veterans.

[1] Presented in the symposium on *Tuberculosis and War* at a joint session of the Medical and Public Health Sections at the 40th annual meeting of the National Tuberculosis Association, Chicago, Illinois, May 12, 1944.

[2] National Director, National Rehabilitation Committee, The American Legion, Washington, D. C.

This toll constitutes a challenging situation. Specialists in this disease and students of its control advise that the campaign to eradicate it must overcome the hurdle created by the war. No matter how effective and successful the overall campaign among our civilian population may be, it will be retarded if some special effort is not made in behalf of those of the armed forces who return afflicted in some form or other with this disease. The problem after the last war has been thoroughly analyzed and delineated. The estimated load from the present hostilities has been projected insofar as data on the point are available. We have been told about the Government's experience with tuberculous veterans of both the last war and so far in this war, and we can readily see that the objective for our campaign is to reduce markedly the number of those who depart from Veterans Administration Hospitals without leave and against doctor's advice. Whether civilian sanatoria and hospitals have had a better record than the Veterans Administration is for experts in this field to determine. We recognize the statistical data so effectively presented by Dr. Louis I. Dublin which would indicate that the experience among various civilian hospitals treating this disease is much more fortunate than that of the Veterans Bureau after the last war. We also recognize the analyses furnished by Dr. Roy A. Wolford, the Assistant Medical Director, Tuberculosis Division of the Veterans Administration. With no thought of arraying one set of figures against the other, we look only to the problem presented by the high number of patients who leave Veterans Administration Hospitals without official permission and against medical advice.

We are told that up to and including February of this year 31.6 per cent of World War II veterans suffering from tuberculosis and admitted to these facilities for treatment were discharged or left under adverse circumstances. In June, 1943 National Commander Waring and members of his staff met with the Administrator of Veterans Affairs, his medical advisers and members of the Medical Council of the Veterans Administration. This meeting may be regarded as the initial step on our part in a joint effort designed to improve the results of hospitalizing these veterans and protecting them and their families from further inroads by this disease. At that time we were informed that the percentage of young veterans leaving their wards against advice and without permission was over 40 per cent. The trend has been downward and we are determined it will thus continue. Our organizations are pledged to join with all agencies and individuals who desire to make the control and eradication of this disease a prime objective now and henceforth.

The Legion, in moving ahead from the June, 1943 conference, adopted a resolution at the Omaha National Convention in September, 1943 wherein it was declared that the Legion take cognizance of these facts:

(1) Many persons are being discharged from the armed forces because of active pulmonary tuberculosis.

(2) Notwithstanding the excellent facilities for the treatment of this disease provided by the Veterans Administration, approximately 40 per cent are leaving against medical advice or are absent without leave.

(3) Tuberculosis is an infectious disease spread by personal contact.

(4) A person who fails to recognize the extreme necessity for supervised treatment becomes a possible source of infection to children, family and community.

On the premise of this declaration the organization dedicated itself to a program of education to the end that all ex-service people afflicted in this way, their families back home and their communities might be properly contacted and the afflicted ones induced to remain in their hospital wards and under supervised treatment until arrest of the disease is reached. It was further decided that in the development of this educational program the Veterans Administration, the national and state tuberculosis associations, local medical societies and all other recognized agencies willing to coöperate should be consulted and their help solicited in the formulation of both therapeutic and corrective measures.

I would like to point out parenthetically that this resolution originated in the great Department of Ohio, where the late Dr. Kennon Dunham had his clinic, and from which state his influence in identifying and combating this scourge went out to all parts of the country and even to foreign shores.

The June 14, 1943 conference, a number of informal discussions and exchanges of ideas on the subject during the balance of 1943 and the early part of 1944, the Omaha resolution No. 84, the participation of the American Legion Auxiliary in a most effective manner, all led to these points as the salient items in the proposed educational project:

(1) Patients, Legion service officers and Auxiliary workers to be furnished and to familiarize themselves with the pamphlet *Waging War Against Tuberculosis.* This is a release by the Veterans Administration, and with its permission the American Legion has had 10,000 extra copies printed and distributed. More will be made available if found necessary.

(2) Since a tuberculous patient cannot be legally committed or deprived of his individual rights to leave a Veterans Administration Hospital and to apply for readmission thereto, special emphasis to be placed upon an intelligent and sympathetic understanding on the part of his folks, Legion service officers and Auxiliary workers to the end that persuasion or encouragement to remain under medical care might really be effective.

(3) Likewise the human side of the individual problem should be served more meticulously by those within the Veterans Administration Hospital who have the duties of attending the patients. It may not be the part of good form and tact for laymen to make adverse observations about our professional co-workers. However, there are Legion service officers and Auxiliary workers who have observed incidents within these hospitals which did not place members of the professional group in the most favorable light. It may not be for us to point out these incidents of deficiencies except to call them to the attention of those in authority, and urge that there must be improvement in the attitude toward the patient before we can win him to the line of thought set forth in this program.

(4) A more effective coöperation with state and local health authorities. This is a relationship which must be and we feel can be more fully developed. Legion

service officers and other officials in the local post, in the county or district organization, or in the state-wide set-up itself should be acquainted with, should confer and consult with the medical men and nurses who operate within the public health agencies. Especially should this be true in those territories where there may be a concentration of the tuberculous victims of war. Much can be gained from a proper understanding on the part of the service officer and the Auxiliary worker as to the extent they might go in enlisting the help and professional guidance of health authorities in persuading the man and his folks that it would be best for him to remain until his doctor gives him permission to leave the hospital. The effect of his returning to a home or a community while still in the infectious stage could be vividly presented to him not as an order, not as a demand, not as an edict, but on a man-to-man basis wherein persuasion and logical reasoning would dominate.

(5) In accordance with professional advice received from our medical coworkers, the Legion to advocate and support any project to obtain the best possible equipment and facilities for treatment, better and more suitable entertainment, occupational therapy where feasible, and vocational training features as provided or recommended by the National Tuberculosis Association.

(6) Trained Legion service officers and Auxiliary workers to make personal contacts with patients and their families, respectively, advising and urging them on a personal interest basis that each patient remain in the hospital until his doctor permits him to leave there on a furlough, extended leave or complete discharge basis.

(7) Insofar as Veterans Administration and local medical facilities permit, detailed instruction on tuberculosis and its control to be arranged for the Legion service officers and Auxiliary hospital workers.

(8) Notification of date and name of each patient leaving hospital AWOL or against medical advice, to be furnished Legion and Auxiliary officials, who in turn will get in touch with local health authorities and members of the patient's family, all to the end that the patient be persuaded to return to the hospital, or at least restrained from exposing members of his household to the disease.

Another step designed to further this program would be an arrangement with the War and Navy Departments whereby tuberculous patients in active service might be given extended hospitalization before being released. The controlling thought in this suggestion is that those in uniform are still under Army or Navy control and discipline. Accordingly it should be much easier to keep these men under appropriate medical and hospital care. We feel sure that this is being developed between the Veterans Administration and the Surgeon Generals' Offices of the two big branches of the armed service. During this period of retention to effect an arrest the approach could and should be made to the victims of this disease on just what the nature of their trouble is so as to make them realize that their acceptance of prolonged hospitalization is for their own good.

During the past several months the American Legion Auxiliary has enthusiastically launched into this enterprise. (*1*) Distribution has been made throughout the organization of the pamphlet *Waging War Against Tuberculosis*. (*2*)

Five area conferences have been held throughout the country, at which instruction was given in tuberculosis treatment and care, and all Department Chairmen had emphasized to them the importance of family contact service of the Auxiliary for coöperation with the family in persuading the veteran to remain in the hospital until properly discharged. (*3*) Schools for hospital visitors are in preparation, with special training courses arranged for workers in tuberculosis facilities. (*4*) Several broadcasts on local networks have been given in all parts of the country and one program on a national hook-up was presented in March of this year. It is reported that all of these efforts have brought satisfying results and have focused attention to the tuberculosis problem on the part of many lay people. (*5*) The National Rehabilitation Chairman of the American Legion Auxiliary and her five area chairmen have given a number of talks before Auxiliary groups, stressing the service that can be and should be rendered to the tuberculous veteran. The National Chairman has a nation-wide schedule or itinerary which she is now following, and on every occasion gives addresses or informal talks on this phase of the joint endeavor of the Legion and Auxiliary.

Supplementing all of the above, a system of bulletins and, in coöperation with Doctor Emerson, information from the tuberculosis pamphlet library have been made available to all Departments. State tuberculosis associations have been approached for this literature so that it might be distributed among the 8,000 or more Auxiliary units.

The Legion and its Auxiliary are in unanimity in believing in the value of the proposed educational program. They are also intent upon implementing these expressions and resolutions with actual deeds and performances. An analysis of the principal reasons for irregular discharges from the Veterans Administration shows that the first consideration which seems to have induced men to leave against their doctors' recommendations is that of worry over family finances, economic status, illness in the family, security of family affectional ties and other phases of the marital adjustment. Closely associated with this is the old-fashioned home-sickness which these young veterans manifest so clearly upon their release from service. If these are the primary reasons for men jeopardizing their lives and the health of their families and communities, then all of us should be challenged to join in this effort not only of education but of assurance to the patients that conditions at home and the folks are fine, that he would be contributing to their future happiness if he agreed with the doctor's professional advice, and that they all support him in submitting to supervised care.

Obviously there are many other thoughts, worries and anxieties which motivate a man to break away and be free again. Such an impulse may be inborn in most of us. When one feels free, well, young and life lies ahead we can readily understand how the tedium of hospital routine and care may prove irksome and increase the desire to get away from it all. As has been aptly expressed in one of the dissertations on this subject—"An accumulation of worries, impressions and grievances builds up an emotional force sufficient to cause the patient to act against his own interest, if not against his reasoned judgment." Friendliness, understanding, man-to-man discussion with the patient, service and advice to

him on his problems, solicitation of his family's welfare and definite provisions to meet emergencies at home, safeguarding the health of the children and his immediate family, are all prime considerations which will make up and effectuate this educational program. Its potentialities are great and it should be exhausted before any other means of persuading these men to take the cure are employed.

May I now address myself to the point of another suggested means of compelling these patients to stay in their hospital wards. You are all familiar more or less with the disability compensation laws for veterans. The base pay for this benefit for both World War I and World War II veterans is $115 per month for permanent and total disability. There are special awards for amputations, loss of the use of members of the body, etc. For the World War I group there is the statutory award of $50 per month for arrested tuberculosis. Partial disabilities receive the proportionate part of the base pay plus such special awards—not including that for arrested tuberculosis—as may be legally payable. For instance, a 20 per cent disability receives $23 per month, 30 per cent $34.50, etc. The ratings and awards for World War II are in gradations or steps of 10 per cent. Awards under the 1925 rating schedule, which is applicable only to World War I veterans, may be based upon percentages of disabilities starting at 10 per cent and continuing in steps of one per cent, depending upon the numerical evaluation application. The act of December 24, 1919 established a temporary total rating of $80 per month for a single man, $90 per month for a married man, with $5 for each child. Under this provision a man who was hospitalized for his service disablement was invariably rated temporary total and received this pay. Prior to and following hospitalization the rating of his disability may well have been considerably less. Hence it is pointed out there might have been an inducement to the disabled who were unable to work and felt they needed treatment to apply for and remain under hospital care for as long as the Veterans Bureau determined to be necessary. It sometimes happened also that patients insisted upon remaining even after it had been determined professionally that he had received the maximum benefit.

It should be pointed out also that by an act of July 2, 1926, known as Public 448, 69th Congress, provision was made for a *per diem* allowance of $2.65 per day for every employed person applying for or in receipt of compensation for service-connected disability when ordered in for examination and observation. You will note that this rate on a monthly basis approximates the rate for temporary total disability, namely, $80 per month. It should be borne in mind that these awards—temporary total or the *per diem*—were payable for the period men were either under treatment or observation in Veterans Bureau Hospitals.

This temporary total rating was done away with by the so-called Economy Act and particularly by Veterans Regulation 6 based upon that act and dated March 31, 1933. Therein it was specified that men in receipt of disability compensation would receive $15 per month ($20 since July 13, 1943) while hospitalized, and those in receipt of pension for non-service-connected permanent total disability would have their awards reduced to $6 per month ($8 since July 13,

1943). This was later amended so that the reduction would not be effective for those who had dependents at home. In other words, they would continue to receive the rate of compensation or pension in effect upon entrance into the hospital.

It was to be expected that changing the form and amount of payment to beneficiaries in receipt of hospital care from a temporary total rating down to $15 per month ($20 since July 13, 1943) for the service-connected cases, and $6 ($8 since July 13, 1943) for the permanent and total non-service-connected, would cause considerable disruption and adverse criticism. That did ensue, and our organization has gone on record proposing that the rate of compensation or pension a man was receiving or entitled to receive when he entered the hospital should not be reduced. Just what the outcome of that effort will be we cannot predict.

With the above outline in mind let us consider the suggestion that granting or withholding money awards would have a beneficial effect in promoting the program of keeping the hospitalized tuberculous veteran under supervision until arrest or cure has been reached. There are those who feel that the full amount of compensation should be paid during the period of hospitalization irrespective of whether or not there are dependents at home. Others feel that a portion of the award should be withheld to be credited to the man's account and given him upon his reaching the maximum benefit or the arrest or cure of his disease as determined by the Veterans Administration doctors. Then there is also the suggestion that, whatever the award to which a man may be entitled while he is being hospitalized, it should be discontinued or withheld entirely if he leaves against medical advice or if he absents himself without official leave.

At first blush any one or all of these methods might seem to be effective. Probably they would be. As to the granting of full compensation while hospitalized, about two-thirds of the beneficiaries would be favorably affected since just about that proportion so far admitted and discharged are single. The married group with dependents at home would continue to receive the full amount. The withholding of compensation payments as a punishment would most surely meet with public disfavor and could not be effective. Whatever change is proposed in respect to the monetary awards for disability, legislation would be necessary, and it is very speculative just what attitude Congress and the people would have toward tampering with the present arrangement.

No one can deny the appeal of monetary considerations in many day-by-day situations. This has been carefully considered by representative officials and members of our two organizations, and the majority are committed to the policy of exhausting every means available in a thoroughgoing educati nal program before invading the field of the financial structure which has been built up in behalf of the disabled veterans of this country.

We understand that the forceful retention of tuberculous patients in hospitals against their will or committing them against their will has been attempted in a number of states. These states have, through provisions of the regulations of

their state boards of health, legal authority to invoke compulsory segregation of recalcitrant tuberculous patients, and in selected cases where the patient is grossly careless in his contact with the people, police power may be exercised. We are told that the application of such power has been resorted to with extreme caution and only after full assurance that the interests of the public necessitated such action. The existence of the state's authority to compel segregation does have a salutary effect in those states. It acts as a deterrent to those who are aware of its authority, who are undergoing treatment in tuberculosis sanatoria, and who may be tempted to depart against medical advice. Doctors advise, and we as laymen readily grasp, that treatment of a patient who is satisfied and coöperative is much more effective than that accorded one who is restrained or coerced to accept such treatment.

It might well be that eventually, with the load of tuberculous victims coming from this war, both the nation and the states will have to tighten their control and invoke their authority to segregate many of these patients. However, if we start now and sincerely launch forth into this project we can help the tuberculous veteran win his own battle. It will take an army to accomplish this—an army composed of the patient himself, his ward doctor and family physician, his attending nurse, his family at home, the local and state health authorities, the National Tuberculosis Association, the service officers and Auxiliary workers, the Veterans Administration and all others who have dedicated themselves to the control and eradication of tuberculosis.

SUMMARY

To counteract and reduce the upward trend of tuberculosis caused by war conditions, efforts by the medical profession, tuberculosis associations, public health agencies and volunteer groups must be coördinated and redoubled.

The American Legion with 1,300,000 members, and the Auxiliary with 600,000 members, are volunteer groups composed of men and women with war service.

They have joined in this program by concentrating upon educating the tuberculous veterans of this war and their folks back home on the necessity of abiding by the doctor's orders and remaining under hospital care until arrest or cure is accomplished.

This educational effort is being accomplished by service officers visiting the patients in hospital wards, persuading them to comply with medical instructions and assuring them of conditions back home.

Ladies of the Auxiliary visit the wives and mothers and acquaint them with the dangers of having a patient with active tuberculosis in their midst, exposing the family and probably the community.

The Legion recommends notices from the Veterans Administration to public health departments and Legion service officers of men who leave hospitals against medical advice.

Conferences should be arranged between service officers, Auxiliary workers, representatives of tuberculosis associations and local physicians on methods of controlling these men when they do return without medical permission.

Since many of the tuberculous veterans are in receipt of disability compensation or pension for their incapacity it has been recommended that some sort of disciplinary control should be established, such as withholding funds or making the full amount of the award available during the veteran's hospitalization.

The American Legion has not formally proceeded with such recommendation since it involves amendatory legislation and since experiences after the last war were not so fortunate.

The Legion and Auxiliary are confident that an aggressive, alert and pointed program of education as to the dangers of tuberculosis not only to the victim himself but to his folks at home and the community will bring about a marked reduction in the number of elopements from the hospitals against advice and will result in a greater number of arrests and cures of the diseased.

SUMARIO

A fin de contrarrestar y rebajar la tendencia ascendente provocada en la tuberculosis por las condiciones de guerra, tienen que coordinar y redoblar sus esfuerzos la profesión médica, las asociaciones antituberculosas, los organismos sanitarios y los grupos cívicos.

En los Estados Unidos la Legión Americana con sus 1,300,000 miembros, y la Auxiliar Femenina de la misma con 600,000 miembros, son grupos cívicos compuestos de hombres y mujeres que han participado en la guerra, y que colaboran en este plan concentrando sus esfuerzos en hacer comprender a los veteranos tuberculosos de la guerra actual, y a las familias de los mismos, la necesidad de observar las instrucciones del médico y de continuar el tratamiento en el hospital hasta obtener el estacionamiento o la curación.

Esa campaña educativa se lleva a cabo por medio de visitas a los enfermos hospitalizados a fin de persuadirlos a que no dejen de cumplir las instrucciones del médico a la vez que se les asegura que todo marcha bien en el seno de sus hogares. A su vez las damas de la Auxiliar Femenina visitan a las esposas y madres, poniéndolas al tanto de los peligros que encierra el convivir con un enfermo con tuberculosis activa, pues expone a la dolencia a la familia y probablemente a la colectividad.

La Legión recomienda que la Administración de Veteranos avise a los departamentos de sanidad y a los funcionarios de la Legión siempre que alguno de esos individuos abandone el hospital en oposición al consejo del médico.

Cuando esos individuos regresan a sus hogares sin permiso del médico los oficiales de los servicios armados, los miembros de la Auxiliar, los representantes de las asociaciones antituberculosas y los médicos de la localidad deben conferenciar con respecto a la mejor manera de controlar a dichos sujetos.

Dado que muchos de los veteranos tuberculosos reciben indemnización o pensión por incapacidad, se ha recomendado el establecimiento de alguna providencia disciplinaria, bien reteniéndose los fondos del sujeto dado, o sólo entregando el subsidio completo mientras el veterano esté hospitalizado. La Legión Americana no ha tomado acción formal sobre estas recomendaciones dado que

exigen legislación y que ciertas medidas de orden algo semejante tomadas después de la guerra pasada no dieron muy buen resultado.

La Legión y su Auxiliar Femenina abrigan la confianza de que un plan educativo activo, completo y acertado que señale los peligros que entraña la tuberculosis no tan sólo para la víctima misma sino para su familia y para la colectividad, obtendrá una marcada disminución en el número de evasiones de los hospitales contra el consejo médico, y conseguirá un número mayor de estacionamientos y curaciones.

TUBERCULOSIS AND WAR

Summary[1]

ESMOND R. LONG[2]

The four addresses we have heard display a unity of purpose, and, in spite of imperfections in our record in the past and an undeniably difficult problem in the present, a healthy optimism for the job in hand. With all due recognition of the likelihood of unexpected contingencies, it appears that we face the immediate situation far from unprepared.

All speakers have made comparisons of the tuberculosis problems of this war and the last. It is universally recognized that the first world war made worse an already bad tuberculosis problem in England and continental Europe, and there seems to be no question that, except for a more favorable position at the outset, history is being repeated in the second. There is no question, too, that the first war created a grave military tuberculosis problem, but in this respect the knowledge gained from the first war has afforded substantial insurance against a repetition.

All agree, however, that we have little reason for complacency in our present measures. It is true that we have placed in effective operation the greatest tuberculosis case-finding program ever known, making possible, through the discovery of thousands of cases, a blow at tuberculosis that might have been deferred for years had military necessity, public health consciousness and industrial responsibility not combined at a time when an even greater need made the necessary machinery available. But, as Doctor Parran has clearly indicated, we have thus far fallen far short of taking full advantage of the results of the gigantic mass X-ray programs of military induction and industrial survey. It may be estimated that these two operations have uncovered not less than 140,000 cases of tuberculosis of immediate or potential significance, and a reasonable estimate is that half of these are cases of present active disease. Shortage of personnel and the immensity of other necessary effort, unfortunately, have prevented adequate follow-up of this large number, a follow-up that would save many lives and prevent much spread of disease in the future.

Let us recognize, however, that the opportunity is not gone, that the records of rejection from military service and diagnosis in industry are still available to us, and that, save for the difficulties interposed by time and migration of discovered cases, proper follow-up is still possible. If all of the discovered cases needing medical care actually received it, and full advantage were taken of still available tuberculosis beds for that care, the future would be spared a great problem.

[1] Presented in the symposium on *Tuberculosis and War* at a joint session of the Medical and Public Health Sections at the 40th annual meeting of the National Tuberculosis Association, Chicago, Illinois, May 12, 1944.

[2] Colonel, Medical Corps, Army of the United States, Consultant on Tuberculosis, Office of the Surgeon General, War Department, Washington, D. C.

A still less well handled problem is the rehabilitation and industrial placement of men discovered with tuberculosis of a character and extent permitting suitably safeguarded labor. Colonel Wolford has drawn attention to the lure of high wages in keeping men at work whose disease renders them unfit for their jobs. It must be remembered, on the other hand, that in this critical period every ounce of labor from those fit to work is needed, and that, to enable full utilization of our manpower, proper provision for work within the capacity of the handicapped should be made.

Great stress has been laid upon the problem of tuberculosis in veterans, and here again the issues are clear. Whatever the shortcomings in the handling of the vereran's problem in the past—and it is clear from the presentations of Doctor Dublin and Colonel Wolford that they were very grave, and at the same time beyond the Veterans Administration's full control—there is no disagreement that a scientifically sound and adequate program must be ensured for the tuberculous veterans of this war.

In determining what is a sound and adequate program it is essential to know the size of the anticipated problem. The best available index of the amount of tuberculosis in the armed forces is the hospital admission rate for this disease, which is expressed in terms of cases per thousand men per year. The Army hospital admission rate for tuberculosis rose in the early months of mobilization, reaching a peak of 3.0 in December, 1941, but has dropped steadily since that time. It was 1.0 in December, 1943, and is approximately 0.8 at the present writing. This steady improvement, after an initial rise related to the exigencies of the developmental period, is a reflection of improved work in the induction stations. Calculation of the total number of cases, on the basis of troop strengths made public by the Secretary of War, leads to the view that approximately 10,000 cases of tuberculosis were taken into the Army. This figure is borne out by reviews of films of inducted men, which are filed with the Veterans Administration in Washington. Since the procedure for induction of men in the Navy has been the same as that for the Army for more than a year, the current admission rate in the Navy is not greatly different.

However, it cannot be doubted that the tuberculosis problem left to the Veterans Administration by the war will be very much larger than the extent indicated by the preceding paragraph. Doctor Dublin has stated that not less than 200,000 veterans of the last war received care by the Veterans Administration for tuberculosis. The total number of hospital admissions for the disease was much larger, because of repeated admissions on the part of numerous tuberculous beneficiaries. It must not be assumed, however, that all of these 200,000 veterans were victims of active tuberculosis at the end of the war. Legislation after the cessation of hostilities defined the Administration's obligation in such manner that it became responsible for the care of thousands of cases of tuberculosis that developed in veterans during succeeding years.

It is not unlikely that comparable provision will be made after this war, in which case the Veterans Administration may have delegated to it the care of the 10,000 or 15,000 cases now in the armed forces, all the new cases that develop

as the war lengthens, and an unpredictable number of cases from breakdown in later life.

In passing it may be of interest to note that the number of cases detected overseas, thus far, is relatively small. Prior to dispatch to combat areas close attention is paid to the physical condition of the men to be sent, and this screening results in not infrequent discovery of cases and transfer to installations in this country, forestalling breakdown overseas. Records in the Office of the Surgeon General of the War Department indicate that only 157 men were sent back because of tuberculosis from all theatres of operation during November and December, 1943. The total number for the whole calendar year 1942 was only 262.

The contrast with the incidence of tuberculosis in our own and other armies in the first world war is striking. You will recall Doctor Parran's statement that within a few months after the opening of that conflict it was reported that 150,000 cases were discovered in the French Army. The number is small, too, in comparison with the incidence detected in the American Army. The average annual admission rate for tuberculosis in the American Army in the United States from April, 1917 to December, 1919 was 13.0 per thousand men per year. As indicated by figures just cited, the current rate is well below one-tenth of the rate in World War I.

However, favorable as the present figures are in comparison with those of the first world war, we must remember that in the aggregate the number of tuberculous soldiers that will require Veterans Administration care will still be large. It must not be overlooked that the armed forces are more than twice as large as at that time, and there is every indication that the war will last longer.

Colonel Wolford has indicated the manner in which soldiers and sailors discharged from the armed forces because of tuberculosis become beneficiaries of the Veterans Administration. Doctor Dublin has emphasized the shortcomings of the past program for the care of veterans, and drawn forceful attention to certain inadequacies in the present procedure. Both he and Colonel Wolford have stressed as a serious problem the unwillingness of veterans to remain under care after they have commenced treatment in Veterans Hospitals.

The remedies for the present situation are fairly clear. Fortunately on this point all speakers are agreed, and not inconsiderable measures are already in effect to overcome them. Mr. Kraabel, in acquainting us with the program of the American Legion and its Auxiliary, has gone into the problem with clear insight. There is sound reason to believe that, with our understanding of the cause of past failure, the measures in force to-day will be much more effective than those in operation after World War I. Prominent among these measures are education, legal compulsion and such legislation for readjustment in compensation as will furnish an inducement to stay in the sanatorium for care, rather than the reverse. In this connection it is to be noted that measures are under way in the armed forces for proper indoctrination of soldiers prior to their discharge, with a view to making them understand the seriousness of their own situation, the necessity of care for their own sake, and their obligation not to endanger their own families and friends through exposure to infection.

No longer is the false view held that the veteran, in reward for his service to his country, must be humored in his every wish. Regardless of our obligation, even regardless of the veteran's willingness to sacrifice his own future health, he cannot be permitted, any more than any other citizen, to jeopardize the health of others by exposing them to a communicable disease. After his months of rigid Army or Navy discipline his desire for return to a normal, independent life is understandable, but society cannot countenance a menace to his fellow citizens through dangerous behavior.

The problem of tuberculosis in the veteran is one requiring the combined efforts of all public agencies responsible for the welfare of ex-soldiers and sailors, and one that will benefit immeasurably by the support of voluntary agencies, such as those represented here. At the present time regular meetings are held for the consideration of tuberculosis problems created by the war, which are attended by representatives of the Army, the Navy, the Veterans Administration, the U. S. Public Health Service and the Selective Service System. These bodies have the able counsel and assistance of the National Research Council, the National Tuberculosis Association, the American Legion and other voluntary bodies. This represents a powerful combination of forces, one of the principal aims of which will be the solution of veterans' and related tuberculosis problems.

In this connection mention should be made of two significant pieces of scientific research, which have been initiated in order to throw further light on the essential reasons for breakdown with tuberculosis. One of these is carried out under the auspices of the Department of Health of the City of New York, with the support and assistance of the National Tuberculosis Association, and the other is under way at the University of Colorado and Fitzsimons General Hospital of the United States Army, with the support of the Committee on Medical Research of the Office of Scientific Research and Development, and the National Research Council. It is believed that these two studies, both of which have to do with the stability of minimal lesions under conditions of strain, will yield important information on the causes of development of active tuberculosis that will be of value not only for the present effort but for the years to come.

No sounder general program could be contemplated than that proposed by Doctor Parran, which is, after all, relatively simple, namely: (*1*) find all cases early; (*2*) treat all cases competently. Carried out literally, this program would lead to eradication of tuberculosis in our population. The program formulated by Doctor Parran is a bold one, including, among other features, X-raying all of the population within the age group in which most tuberculosis occurs, but bold as it is, it is by no means out of the range of possibility.

The ground work for such a program is education—education of the tuberculous patient, education of the public in general and education of the legislators who make the laws under which we operate. Education is the primary responsibility of the National Tuberculosis Association. Never has the Association had greater cause to exert its full efforts than now, and never has the opportunity been greater.

THE INDISPENSABILITY OF ROUTINE X-RAY EXAMINATIONS OF THE CHEST IN A GENERAL CLINIC[1,2,3]

ROBERT G. BLOCH AND WILLIAM B. TUCKER

The importance of roentgenological examinations of the chest for the discovery of pulmonary tuberculosis in supposedly healthy individuals is now undisputed. It seems superfluous to reëmphasize the inadequacy of physical examination for the discovery of pulmonary lesions, nor do we need to point out how meaningless are healthy appearance and absence of symptoms in the task of finding early and even a good deal of advanced disease. With the rapidly increasing realization of these facts and under the impetus of the war, large scale X-ray examinations are being conducted in the armed forces, in the industries, among racial and socially underprivileged groups. All of us hope that with a growing awareness by the people of their necessity, these surveys will become universal before long. The organizations concerning themselves with the fight against tuberculosis have often pointed out that, besides the efforts of public and private health authorities, it is the practicing physician's office which should act as one of the chief case-finding agencies. If so much tuberculosis can be uncovered among the seemingly healthy population, it stands to reason that more should be found among those who seek medical aid because they feel sick. Since the disease thrives under so many disguises, not always easily recognized as the result of pulmonary involvement, and since it so often coexists with unrelated conditions which bring the patient under medical care, it follows that in private practice, in general clinics and hospitals—public as well as private—much pulmonary tuberculosis must go unrecognized unless all patients are subjected to a roentgenological examination of the chest. Our own experience in the past has not indicated that this need has found much appreciation in general medical practice. The prevailing attitude seems to be well expressed in the response to two questions recently asked of the private hospitals in the metropolitan area of Chicago. The first question, "Do you admit patients with pulmonary tuberculosis in your hospital for treatment of that disease?", was answered with "No" by 68 out of 73 institutions and with "Yes" by only 5. To the second question, "Do you admit patients with known pulmonary tuberculosis for treatment of other conditions?", 28 replied with "Yes" and 48 with "No" or with comments which amounted to a negative answer. These comments indicated that many hospital administrators feel on the defensive about accepting tuberculous patients. They seemed to look upon the questionnaire as an insinuation that the admission of such patients is an administrative short-

[1] From the Department of Medicine of the Frank Billings Clinic, University of Chicago, Chicago, Illinois.

[2] This work was made possible through the generosity of Mrs. Etta Carrol Baker, Highland Park, Illinois.

[3] Presented before the Medical Section at the 40th annual meeting of the National Tuberculosis Association, Chicago, Illinois, May 11, 1944.

coming. By mentioning this survey we do not mean to imply that we consider the question whether or not general hospitals are willing to accept patients for the treatment of tuberculosis as one of paramount importance in the solution of the tuberculosis problem and this was not the reason why the questionnaire was sent. In fact, it was sent in the conviction and out of the experience that all general hospitals unavoidably *will* have tuberculous patients in their rooms and wards at all times and therefore should take steps to isolate them properly.

Fluoroscopic examinations among the clinic patients of the University of Chicago Clinics and of the affiliated Provident Hospital were introduced after several years of experience with routine examinations of University students and hospital personnel. Beginning in 1934, the patients of the Prenatal Clinic of the Chicago Lying-In Hospital were fluoroscoped routinely. This is a physiologically strained group but not one of patients in the strict sense of the word. However, the dangers of pregnancy and childbirth in the presence of active tuberculosis made this appear a need of the first order. The results have been highly gratifying and the disastrous results of the uncontrolled coexistence of both conditions have since been avoided, at least in those patients who came under care during the early stage of pregnancy, but even in others the worst has frequently been avoided by proper isolation of the baby and by therapy for the mother. In 1939 chest fluoroscopy of all clinic patients, regardless of the nature of their complaint, was begun in the clinic of the Provident Hospital. The results obtained in the first 25,000 Negroes so examined were that, in 4 per cent of the total number, tuberculous involvement of the lung other than residuals of primary infections was found, and that 2.6 per cent had clinically important disease. The detailed findings in the various groups so far mentioned were reported in a series of publications (1, 2, 3, 4). In October, 1942 the same routine procedure was introduced in the Out Patient Department of the University Clinics. A fluoroscopic plant was established adjoining the clinical laboratory where, with few exceptions, the patients are sent for routine tests before reporting to the various clinics. The patients are ushered into the fluoroscopy room by an attendant either before or after the laboratory tests have been completed. They enter and leave the examining room by two separate mazes. They carry a blank (figure 1) designed for the recording of the fluoroscopic findings, which has been handed them in the admitting office. The fluoroscopist records his findings by checking prepared items on this blank; he refrains from giving any information about the findings to the patient and reports the impression gained from his observation but no definite diagnosis. In all cases of suspicious or definite findings which seem to warrant examination by roentgenograms, he suggests this to the clinician but does not order the films himself. Blanks with completely negative findings are returned to the patient to take to the clinic; all positive findings, be they ever so small and insignificant, are delivered there by an attendant. A stub with a short duplicate of the findings is retained for statistical purposes by the division of pulmonary diseases which conducts the fluoroscopic clinic and is responsible for its performance. It takes approximately one hour's

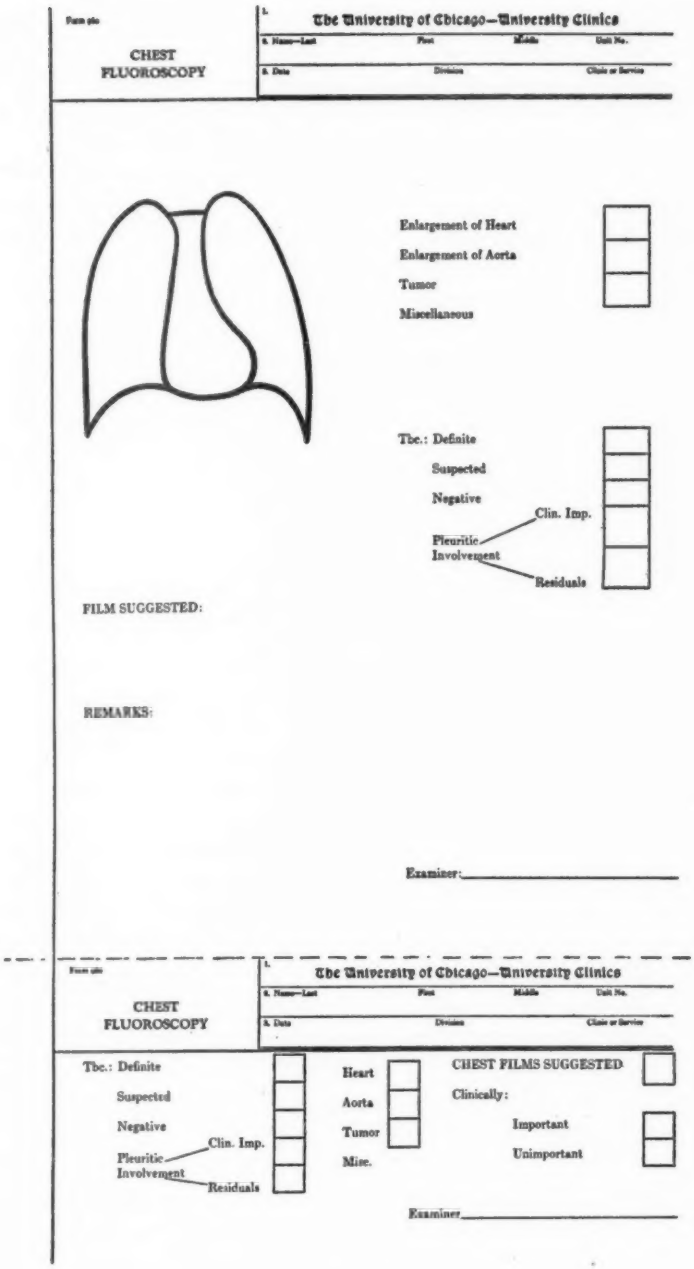


FIG. 1

time before each clinic period, every morning and afternoon, to fluoroscope all patients on days with average clinic attendance.

It is the purpose of this paper to give an analysis of the results obtained in

the first 15,000 patients examined in this group. A number of tables have been prepared which will clarify a diversity of findings and permit interesting comparison between the figures obtained from the white and the Negro group of patients. We wish to emphasize that the figures presented here are not those obtained from the fluoroscopic impressions but have, in most cases, been corrected from the finished diagnosis taken from the patient's completed record. Figures gained from fluoroscopic impressions alone would be considerably higher.

The total findings of reinfection type tuberculosis are practically the same in both racial groups (table 1) but while among white patients clinically important disease was only half as frequent as the clinically unimportant, the reverse is true in Negroes. This lends further credence to the experience of recent years that the total amount of involvement of the adult type is not different in the two population groups but that the disease tends to take a less favorable course in the Negro. A study of the distribution of lesions by age groups (chart 1) shows a steady rise of their total number with increasing age but little change in the occurrence of clinically important disease. The diagnostic differentiation into

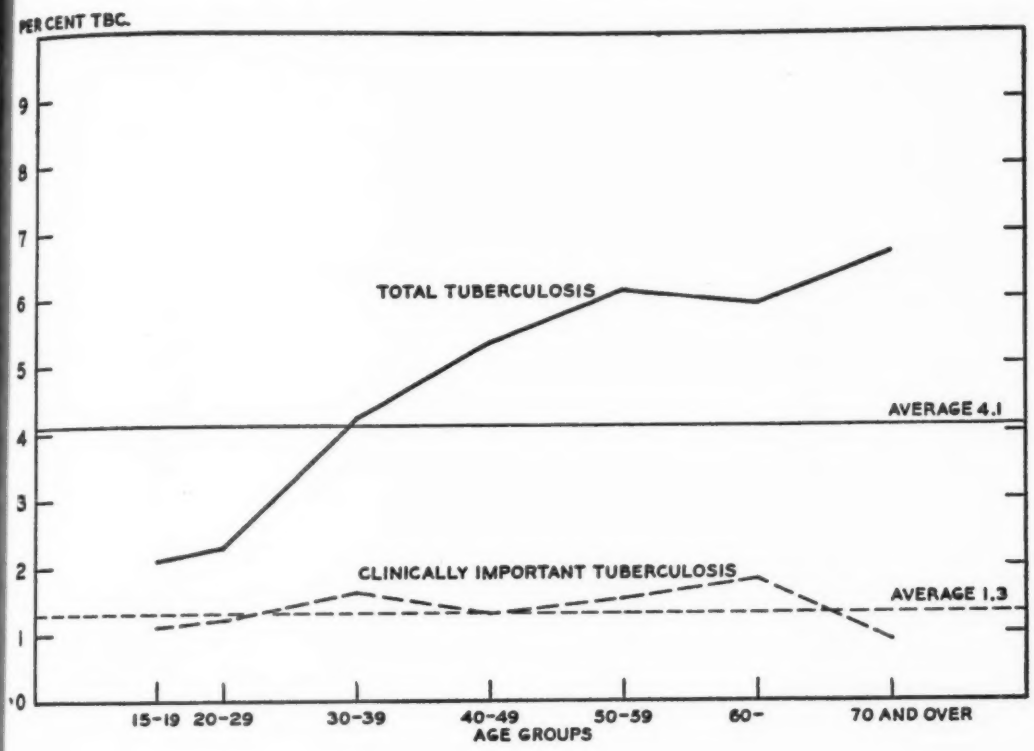
TABLE 1

Prevalence of tuberculosis

	15,000 CASES WHITE		25,000 CASES NEGROES	
	Number	Per cent	Number	Per cent
Clinically important	215	1.43	660	2.64
Clinically unimportant	411	2.74	339	1.36
Totals	626	4.17	999	4.00

minimal, moderately advanced and far advanced disease (table 2) results in a great preponderance of minimal tuberculosis which exceeds in numbers the total of the two other classifications. The separately itemized figures which were obtained from the patients of the Chest Clinic show a shift toward the more advanced forms of tuberculosis as compared with the findings from the other clinics. They express the expected difference between the pulmonary status of the clientele of the lung specialist and of that of the general practitioner. These findings represent a reversal of the distribution of tuberculosis in the average sanatorium population (chart 2); there can be no doubt that this reversal in the distribution of the disease stages in sanatorium patients from that found in general practice signifies one of the major problems in the present-day fight against the disease. It demonstrates the vicious cycle resulting from the lack of hospital facilities which causes the patient with advanced disease to deprive the one with less advanced involvement of the possibility of institutional treatment, thus in turn causing him to progress into the far advanced stage himself.

The findings analyzed according to the various special groups of clinics to which the patients were assigned by the admitting office are the same throughout. Since physical examination of the chest carried out in the specialized clinics



NO. CASES IMPT. TUBERCULOSIS	13	52	56	35	31	17	3	208
NO. CASES TOTAL TUBERCULOSIS	26	97	143	144	128	55	23	619
NO. CASES EXAMINED	1245	4258	3406	2739	2086	920	346	15,000

CHART 1

TABLE 2

Distribution by stage of clinically important tuberculous lesions found on routine fluoroscopy

University of Chicago Clinics

	MINIMAL		MODERATELY ADVANCED		FAR ADVANCED		TOTAL	
	Number	Per cent of total	Number	Per cent of total	Number	Per cent of total	Number	Per cent of total
Chest clinic	36	43.9	18	22.0	28	34.1	82	38.1
All other clinics	90	67.7	22	16.5	21	15.8	133	61.9
Total	126	58.6	40	18.6	49	22.8	215	100.0

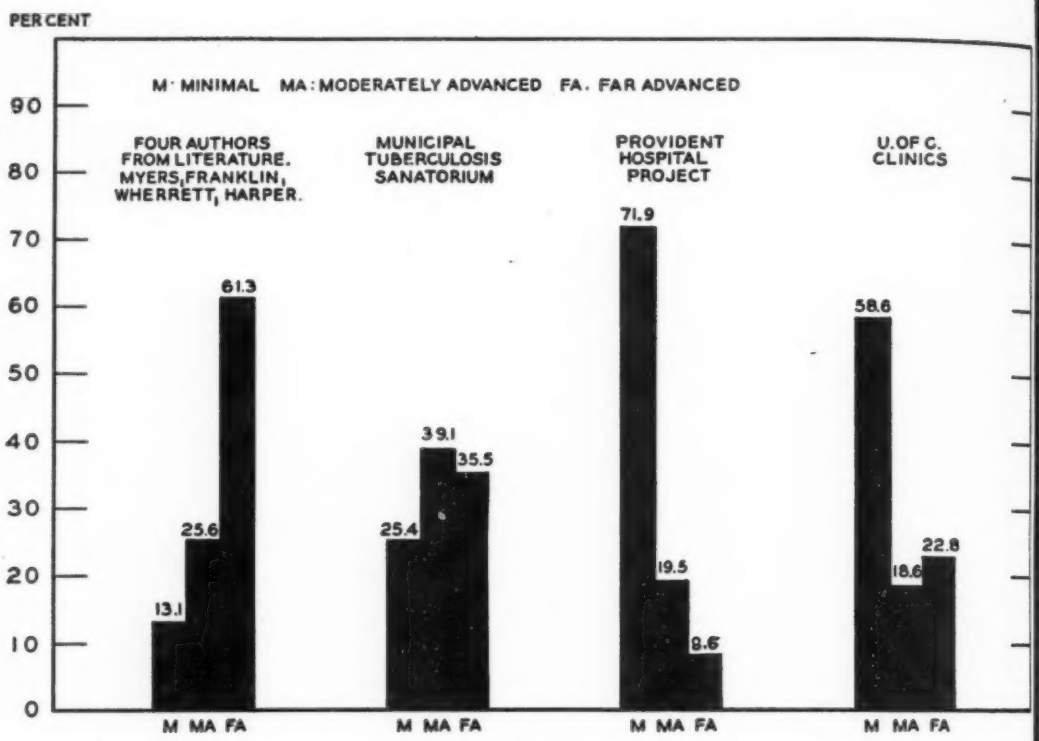


CHART 2

TABLE 3

Prevalence of tuberculosis, by clinics

University of Chicago Clinics

CLINICS	NUMBER FLUOROSCOPED	CLINICALLY IMPORTANT TUBERCULOSIS	CLINICALLY UNIMPORTANT TUBERCULOSIS	TOTAL TUBERCULOSIS
		per cent	*per cent*	*per cent*
Chest clinic	460	17.8	13.0	30.8
Other medical clinics	7,168	0.8	2.4	3.2
Surgical clinics	4,260	1.0	2.3	3.3
Special clinics	3,112	0.8	2.5	3.3
Total, clinics other than chest clinic	14,540	0.9	2.4	3.3
Total, all clinics	15,000	1.4	2.7	4.1

differs widely in effort and quality, the identity of these figures is a comment on the value of physical examination as such. The figures for the Chest Clinic (table 3) were, as in table 2, itemized separately as not applying to those of

general practice because of the preponderance of patients with suspected or prediagnosed tuberculosis who are referred for consultation.

TABLE 4

Prevalence of other lung diseases

	15,000 CASES WHITE		25,000 CASES NEGROES	
	Number	Per cent	Number	Per cent
Emphysema	71	0.47	16	0.06
Pneumonia (all forms)	21	0.14	30	0.12
Bronchiectasis	21	0.14	11	0.04
Pulmonary fibrosis (and pneumonoconiosis)	11	0.07	4	0.02
Silicosis	8	0.05	0	0.00
Atelectasis	7	0.05	0	0.00
Lung abscess	0	0.00	12	0.05
Totals	139	0.93	73	0.29

TABLE 5

Prevalence of mediastinal and diaphragmatic lesions

	15,000 CASES WHITE		25,000 CASES NEGROES	
	Number	Per cent	Number	Per cent
Substernal thyroid	46	0.31	7	0.03
Diaphragmatic involvement	36	0.24	27	0.11
Esophageal involvement	2	0.01	1	0.00
Undiagnosed hilar involvement	1	0.01	2	0.01
Totals	85	0.57	37	0.15

TABLE 6

Prevalence of skeletal lesions and foreign bodies

	15,000 CASES WHITE		25,000 CASES NEGROES	
	Number	Per cent	Number	Per cent
Scoliosis	147	0.98	99	0.40
Fractured scapula	1	0.01	0	0.00
Dislocated shoulder	1	0.01	0	0.00
Foreign bodies	6	0.04	70	0.28
Totals	155	1.04	169	0.68

In the following we report the findings of nontuberculous, pulmonary and extrapulmonary involvements (tables 4, 5, 6, 7, 8) which in number constitute by far the larger portion of the total of pathological and anomalous conditions

which were observed. The occurrence of some incidental observations, the most important of which were thyroid enlargements, diaphragmatic involvement (table 5), was similar in the two racial groups except for foreign bodies (table 6) which were much more numerous among Negroes. The almost identical frequency of pleuritic residuals (table 7) can be interpreted as another hint that the tuberculous infection rate is the same in the white and Negro population.

Intrathoracic neoplasm was found in 0.6 per cent of all patients examined (table 9). The differentiation into various types of tumors classifies one-third

TABLE 7

Prevalence of pleural lesions

	15,000 CASES WHITE		25,000 CASES NEGROES	
	Number	Per cent	Number	Per cent
Pleuritic residuals	527	3.51	965	3.86
Pleural effusion	43	0.29	28	0.11
Spontaneous pneumothorax	13	0.09	5	0.02
Empyema	3	0.02	0	0.00
Oleothorax	1	0.01	0	0.00
Totals	587	3.91	998	3.99

TABLE 8

Prevalence of anomalies

	15,000 CASES WHITE		25,000 CASES NEGROES	
	Number	Per cent	Number	Per cent
Cervical and other rib anomalies	85	0.57	93	0.37
Azygos lobe	21	0.14	7	0.03
Dextrocardia (and *situs inversus*)	4	0.03	2	0.01
Congen. cystic disease	1	0.01	0	0.00
Skeletal anomalies (sternum, spine)	1	0.01	3	0.01
Totals	112	0.75	105	0.42

of the total as metastatic lesions and more than one-fourth were subsequently diagnosed as primary bronchogenic carcinoma. There is a marked discrepancy in the figures obtained in white and Negro patients. In part, this is explained again by the fact that the Chest Clinic in the University, to a large extent, functions as a consultation clinic where many patients come for confirmation of a previously established diagnosis or for therapy. However, in half of these tumor patients this was not the case. They had been assigned to special clinics where physical examinations which might be expected to lead to a correct diagnosis are not carried out. The question of physical findings, however, seems altogether irrelevant since none whatsoever are elicited in the great majority of

patients with tumors and never in those with really early involvements. The complaints which caused these patients to seek medical care in many cases were entirely unrelated to the pulmonary findings.

Involvements of the cardiovascular system make up the greater part of all observations (table 10). They were found in 14.4 per cent of all patients and were about equally divided into enlargements of the heart and of the aorta.

TABLE 9

Prevalence of tumors

	15,000 CASES WHITE		25,000 CASES NEGROES	
	Number	Per cent	Number	Per cent
Metastases	34	0.23	3	0.01
Primary bronchial carcinoma	25	0.17	3	0.01
Lymphoma	19	0.13	0	0.00
Sarcoma	5	0.03	0	0.00
Undiagnosed	5	0.03	12	0.05
Miscallaneous: dermoid cyst 1, neurofibroma 1, haemangioma 1	3	0.02	0	0.00
Totals	91	0.61	18	0.07

TABLE 10

Prevalence of cardiovascular disease

	15,000 CASES WHITE		25,000 CASES NEGROES	
	Number	Per cent	Number	Per cent
Enlarged hearts	1,175	7.83	2,693	10.77
Enlarged aortas	937	6.25	2,511	10.04
Chronic passive congestion	54	0.36	19	0.07
Totals	2,166	14.44	5,223	20.88

Their number was considerably higher among Negroes, which can be explained by the higher incidence of syphilis in that group.

GENERAL COMMENTS

A summary of all findings is offered in table 11. The total of 21.2 per cent of pathological or anomalous observations by a single short method of examination is impressive. The high incidence of nontuberculous disease, such as malignant neoplasms and extrapulmonary, chiefly cardiovascular conditions, would highly justify a routine roentgenological examination of the chest of all patients in any type of medical practice. In the University of Chicago Clinics it is now ful-

filling that general purpose, although the program was begun as a case-finding survey for pulmonary tuberculosis. However, the diagnosis of tuberculosis in 4 per cent of all patients and in 1.5 per cent as clinically important involvement would not require additional performance of routine fluoroscopy to make the program a necessity.

It appears that much needs to be done to introduce this concept to the medical profession. Joslin (5) estimates that routine urinalysis uncovers the presence of diabetes in only 0.4 per cent of all patients examined. There seem to be no published opinions as to how many cases of blood dyscrasias are first recognized by routine blood counts, but several experts whom we consulted estimated them

TABLE 11

Comparative prevalence of findings by routine chest fluoroscopy

University of Chicago Clinics and Provident Hospital Clinic

Summary

FINDINGS	15,000 CASES WHITE		25,000 CASES NEGROES	
	Number	Per cent	Number	Per cent
Tuberculosis	626	4.17	999	4.00
Cardiovascular disease	2,166	14.44	5,223	20.88
Tumors	91	0.61	18	0.07
Other lung involvement	139	0.93	73	0.29
Pleural involvement	587	3.91	998	3.99
Anomalies	112	0.75	105	0.42
Mediastinal and diaphragmatic involvement	85	0.57	37	0.15
Skeletal involvement	149	1.00	99	0.40
Foreign bodies	6	0.04	70	0.28
Total findings	3,961	26.42	7,622	30.48
Less duplications	−774	−5.16	−1,331	−5.32
Net number patients with findings	3,187	21.26	6,291	25.16

as small fractions of 1 per cent of the total number of patients. We submit that any physician or institution that did not require urinalysis and blood counts as routine tests would fall short of present-day requirements of good medical practice. The same applies for serological tests for all patients to rule out syphilis. The incidence of clinically important tuberculosis established by chest fluoroscopy in the expectant mothers of the Lying-In Hospital Clinic exceeds the findings of syphilis by routine Wassermann tests and thereby proves the search for pulmonary involvement as at least equally important in the control of complicating diseases in pregnancy (3).

On the basis of the figures so far presented we could make the conservative estimate that, during the first fifteen years of the existence of the University of Chicago Clinics, that is, before the introduction of routine X-ray examination

of the chest, about 3,000 patients with clinically important pulmonary tuberculosis were allowed to pass through the institution's Out Patient Department without that condition having been recognized. According to the available statistics (6) approximately 45,000,000 adult persons seek medical care for one or more complaints every year in the United States. We feel certain that the quality of diagnostic procedures in our institution measures up to the average and that it is justified to apply our figures to the country's total number of clinic and office patients. The conclusion is that about 600,000 tuberculous individuals annually undergo a medical examination by which their disease is not recognized.

The question of the extent of the physician's diagnostic responsibility is difficult to answer. In part at least, it should be met by deciding whether or not all of a patient's ailments should be diagnosed or only those obviously related to the complaints which bring him under medical care. The former would render the doctor duty bound to find a patient's diabetes or hypertension or leukaemia or tuberculosis, even though he reports only because of an injured finger or a cinder in his eye. We do not dare to suggest that this concept of medical practice should be accepted as a moral obligation by physicians, but we do feel that here is a problem in the practice of medicine which requires a solution.

After the great success which has been achieved with small roentgenograms in mass examinations of the chest, the question why we use fluoroscopy in our case-finding will be asked even more vigorously than has been the case on previous occasions. We do not wish to engage in detailed comments on the merits and demerits of the fluoroscopic method; they have been discussed in a previous publication (7). For the purpose of quick results in a large general clinic, fluoroscopy makes it possible to acquaint the examining clinician in charge of the patient with the roentgenological findings before he examines the patient; in fact, as experience has shown, before the results of other laboratory tests reach him. However, neither speed nor the low expense have been the chief reason for our unwillingness to adopt a different method of examination. The main motive is of an academic nature. In a teaching institution the training of medical students and young physicians has to be a primary consideration. Deeply convinced that the recognition and appraisal of intrathroacic disease should be as important an educational aim as other and better accepted medical skills, we feel that only experience in fluoroscopic diagnosis and the appreciation of its possibilities acquired in medical school will bring into the offices of future physicians the natural desire to discover chest disease and make a real contribution to case-finding. Our experience so far has justified this attitude. Medical students as well as members of the house staff crowd the fluoroscopic room to learn by observation and after an adequate training period most members of the house staff are anxious to participate as examiners. Even the lack of personnel during the war has caused little difficulty in filling the fluoroscopic schedule. Unless still finer, speedier and less expensive methods of roentgenography than those in use now are in store for the future, private physicians cannot be expected to burden themselves with the expense of special equipment and of personnel for

its operation, but it can be assumed that the already wide-spread use in physicians' offices of the fluoroscope, which extends to many extrathoracic diagnostic needs, will increase rapidly. If public agencies continue to organize the universal search for chest disease in the general population, the fluoroscope in the doctor's office alone will enable him to make his individual contribution.

SUMMARY

Routine fluoroscopy of the chest of all patients, regardless of the nature of their complaints, is an accepted procedure in the Clinics of the University of Chicago. The results obtained from the first 15,000 patients are reported in this paper: 4.17 per cent of the total number were found to have tuberculous lesions of the reinfection type. In 1.43 per cent these lesions were recognized as clinically important. The findings are compared with those obtained in a group of 25,000 Negroes among whom the total prevalence was the same while the differentiation into clinically important and unimportant disease signified a less favorable response to the infection by the Negro. Minimal tuberculosis prevails in all groups of patients so examined, causing a reversal of the distribution of the stages of the disease from that observed in tuberculosis hospitals.

A large number of nontuberculous, pulmonary and of extrapulmonary involvements were observed. The most important among these were malignant neoplasms with a percentage of 0.6 per cent and cardiovascular disease which was present in 14.4 per cent of the total number. The over-all percentage of pathological findings was 21.2 per cent.

On the basis of the figures thus gained, it is estimated that throughout the United States about 600,000 persons with active pulmonary tuberculosis come under medical treatment for some complaint annually without their lung involvement being recognized.

The fluoroscopic procedure in the Clinic is described and some advantages of fluoroscopy over other methods of examination are discussed. In this connection its teaching value is emphasized.

SUMARIO

En las clínicas de la Universidad de Chicago la roentgenoscopia sistemática del tórax de todos los enfermos, independiente de la naturaleza de sus síntomas, constituye un procedimiento aceptado, y en este trabajo preséntase el resultado obtenido en los primeros 15,000 enfermos: 4.17 por ciento del total tenía lesiones tuberculosas del tipo de reinfección, que en 1.43 por ciento poseían importancia clínica. Compáranse esos hallazgos con los obtenidos en un grupo de 25,000 negros, entre los cuales la prevalecencia total era idéntica, en tanto que la diferenciación entre enfermedad clínicamente importante y sin importancia, reveló una respuesta menos favorable a la infección en el negro. En todos los grupos examinados observóse tuberculosis mínima, lo cual invierte la distribución de los períodos de la enfermedad cuando se compara con la observada en los hospitales para tuberculosos.

Se observó un gran número de lesiones pulmonares y extrapulmonares no tu-

berculosas, consistiendo las más importantes en neoplasias malignas con un porcentaje de 0.6 y afecciones cardiovasculares con 14.4 por ciento del total. El porcentaje global de hallazgos patológicos se elevó a 21.2 por ciento.

Tomando por base las cifras así obtenidas calcúlase que en los Estados Unidos solicitan cada año tratamiento médico por algún síntoma unas 600,000 personas con tuberculosis pulmonar activa sin que se reconozca ésta.

Describese el procedimiento roentgenoscópico utilizado en la clínica y algunas ventajas que posee la roentgenoscopia sobre otros medios de examen. recalcándose de paso su valor didáctico.

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PROMIZOLE IN TUBERCULOSIS

The Effect on Previously Established Tuberculosis of Guinea Pigs of 4,2′-Diaminophenyl-5′-Thiazolylsulfone (Promizole)

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Although 4,4′-diaminodiphenylsulfone and certain derivatives of this compound are capable of exerting a markedly deterrent effect on tuberculosis established experimentally in guinea pigs, the clinical application of these compounds has been limited because of their objectionable toxicity in therapeutically adequate doses. Consequently the search for effective new compounds having a wider margin of safety for human beings has continued.

The present report is concerned with a chemical substance that was capable, under the conditions imposed, of influencing favorably the expected course of experimental tuberculosis in the highly susceptible guinea pig. Of much interest and importance is the fact that the compound is well tolerated by human beings in doses greatly in excess of the tolerated doses of any of the other derivatives of 4,4′-diaminodiphenylsulfone which have come to our attention.[3]

CHEMICAL STRUCTURE AND PROPERTIES OF PROMIZOLE

Promizole is the trade-marked name of 4,2′-diaminophenyl-5′-thiazolylsulfone or 2-amino-5-sulfanilyl thiazole, which was first described by Bambas (3). The structural formula of this compound is illustrated in figure 1. The compound is an isostere of 4,4′-diaminodiphenylsulfone, one aminophenyl group or aniline group having been replaced by 2-aminothiazole. According to Sudborough (4), 2-aminothiazole has a perfectly aromatic character like that of aniline. In dilute acids only the amine on the phenyl group is diazotizable and gives the sulfanilamide type of color reaction. Hence, any accepted method for determining sulfonamide compounds may be used for determining promizole in the blood, providing promizole is used as a standard.

Promizole is a light, finely crystalline powder having a whitish color and a mildly bitter taste. It has a molecular weight of 255. It is very soluble in dilute acids, acetone, dioxane and dilute (70 per cent) ethanol; moderately soluble in absolute ethanol, ethyl acetate and ether. Promizole is soluble in water at pH 6.5 and 28° to 30°C. to the extent of 30 to 40 mg. per 100 cc. It is not appreciably more soluble in urine *in vitro* than in water, at the same temperature. However, it is conjugated in the human body in such a way as to yield a highly soluble excretion product. The compound formed by acetylating the aminothiazolyl group is soluble in alkali and forms a sodium salt of pH 10. The acetyl derivative of the phenyl amine is not soluble in alkali.

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[3] Preliminary reports of the effects of promizole in experimental tuberculosis and of the tolerance of human beings for the drug have been published previously (1, 2).

METHODS

The data on which this report is based were obtained from two experiments utilizing a total of 126 guinea pigs. The infective agent was a tubercle bacillus of human origin, the virulent variant of H37 (H37RV).[4] The guinea pigs were all males weighing between 450 and 500 g. each. The drug was administered by incorporating it in the feed.[5] In each experiment the effectiveness of promizole was compared with that of a drug of known efficacy. In the first or preliminary experiment promizole was compared with 4,4′-diaminodiphenylsulfone and in the second experiment with promin (sodium p,p′-diaminodiphenylsulfone-N,N′-didextrose sulfonate). The promizole used was supplied through the courtesy of Dr. E. A. Sharp and Dr. L. A. Sweet, Parke, Davis and Company, Detroit, Michigan.

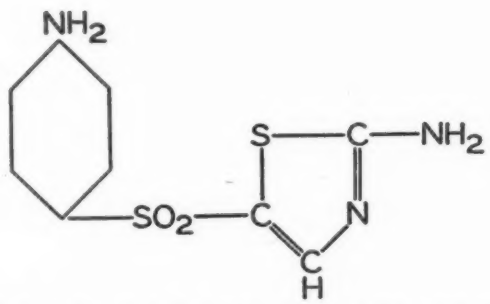


FIG. 1. Structural formula of 4,2′-diaminophenyl-5′-thiazolylsulfone (promizole)

PRELIMINARY EXPERIMENT

The first study of promizole *in vivo* was of relatively short duration and was a presumptive rather than a crucial test of this drug. Forty-two guinea pigs were used. These were divided into three groups as follows: group 1, controls, 14 animals; group 2, to receive 4,4′-diaminodiphenylsulfone, 14 animals; and group 3, to receive promizole, 14 animals. The feed of group 2 and of group 3 contained 0.5 per cent by weight of the respective drugs for a period of six days after which the percentage of promizole was increased to 1 per cent. Three days later—nine days after medication had been begun—all animals in each of the three groups were inoculated subcutaneously with 0.1 mg. of an eighteen-day-old culture of tubercle bacilli (H37RV).[6] The medication of the animals in group 2

[4] The biological characteristics of this strain of tubercle bacilli were studied comprehensively and reported upon by Oatway and Steenken (5).

[5] The animals were fed the meal form of "Rabbit Chow," which was supplemented twice weekly by raw cabbage or other suitable fresh vegetables. To make the diet containing the drugs more palatable, corn syrup (Blue Label Karo) to the amount of 2 per cent was added to the feed of all animals, including those that remained untreated.

[6] The reason the animals were medicated for so many days prior to inoculation with the infective inoculum was that, since promizole was a new and previously untried drug, it was necessary to establish the maximal tolerated dose for guinea pigs before the experiment was actually started. Ordinarily in a presumptive test if the dosage is known, medication for two to three days is sufficient before the animals are inoculated.

and in group 3 was continued daily until the sixtieth day after inoculation, when all of the surviving animals were killed. During the period of observation 4 animals died: one, thirty-five days after infection, from the group that was receiving 4,4′-diaminodiphenylsulfone and 3 from the group receiving promizole. The last mentioned 3 animals died nineteen, twenty-one and thirty-one days, respectively, after being inoculated with tubercle bacilli. Subsequent experience suggests that the deaths of the 4 animals that died before the experiment was terminated were probably related to the toxic effects of the drugs. However, in one of the 3 animals receiving promizole that died there was present sufficient tuberculosis to have accounted for death. The amount of tuberculosis in the other 2 animals that died in the group receiving promizole was minimal.

The relative effectiveness of 4,4′-diamiaminodiphenylsulfone and of promizole was determined by histological examination of the spleens, livers and lungs and the results were compared with the tuberculous changes that had occurred in the

TABLE 1

Average severity of tuberculosis in different organs expressed numerically. Preliminary experiment. Duration of experiment sixty days

GROUP	SPLEEN (MAX. 35)	LUNG* (MAX. 30)	LIVER (MAX. 25)	AVERAGE INDEX OF INFECTION (MAX. 90)
Controls (14 animals)	31.8	16.4	18.2	66.4
4,4′-diaminodiphenylsulfone (13 animals)	1.3	1.8	1.3	4.4
Promizole† (11 animals)	1.9	2.2	2.1	6.2

* Includes contiguous lymph nodes.

† 4,2′-diaminophenyl-5′-thiazolylsulfone.

untreated or control group. The comparative results of the histological examinations expressed numerically are shown in table 1.[7] Only those guinea pigs that survived the sixty-day period after infection are included in data summarized in table 1.

Microscopically, impressive differences existed in the spleens, livers and lungs of the animals that had received promizole and those that were untreated. In the untreated animals the tuberculosis was consistently severe and destructive, while, with very few exceptions, the disease in the animals that had received 4,4′-diaminodiphenylsulfone and promizole was minimal in amount and appeared in practically all instances to be nonprogressive. Although 4,4′-diaminodiphenylsulfone seemed to be more effective than promizole, the difference was perhaps of questionable significance.

The data obtained from the first experiment appeared to justify a further, more extensive and more crucial study of promizole. While the results of ad-

[7] The scheme followed in recording numerically the amount of tuberculosis in experimentally infected guinea pigs is based largely on the degree of tuberculous involvement and the progressive or nonprogressive character of the tuberculous changes as determined numerically. This scheme has been described in detail previously (6).

ministration of 4,4′-diaminodiphenylsulfone were anticipated and were consistent with those reported previously (7), it was considered unwise to draw definite conclusions concerning the tuberculo-chemotherapeutic efficacy of promizole until the results of an experiment of more rigorous conditions than obtained in the first experiment were known. It is obvious that when the medication is started several days before the infective agent is introduced the experiment is one of prophylaxis rather than of therapy. Consequently a second experiment was planned in which the disease was likely to be well established before the administration of the drug was started.

SECOND EXPERIMENT

Five groups of guinea pigs were utilized. Each animal was inoculated subcutaneously with 0.000,5 mg. of an eleven-day-old culture of the same strain of tubercle bacilli used in the preliminary experiment. In the second experiment the therapeutic efficacy of promizole was compared with that of promin, which we have studied previously in detail (8, 9, 10). The respective groups of animals were as follows: group 1, untreated controls, 20 animals; group 2, treated with promin starting six weeks after infection, 20 animals; group 3, treated with promizole starting six weeks after infection, 20 animals; group 4, treated with promizole starting ten weeks after infection, 13 animals; and group 5, treated with promizole starting fourteen weeks after infection, 15 animals.[8]

Since the dosage of promizole used in the first experiment was considered too large, the amount of drug added to the feed in group 3 of the second experiment was reduced to 0.25 per cent for the first twelve days of treatment and increased during the next three weeks to 0.5 per cent. The amount of promizole added to the feed of the animals in group 4 and group 5 was 0.5 per cent by weight. The amount of promizole ingested each twenty-four hours by the animals receiving feed containing 0.5 per cent of the drug by weight was estimated to be 200 to 225 mg. Group 2 received feed containing 1.0 per cent of promin and the intake of the drug per animal each twenty-four hours was estimated at 400 to 450 mg. The experiment was continued for two hundred and twenty-six days after the animals had been inoculated with tubercle bacilli. The surviving animals were then killed for necropsy.

Tuberculin tests: Two hundred and twenty-four days after the animals had been inoculated with tubercle bacilli they were again tested for sensitivity to tuberculin.[9] Of the 4 animals surviving in the control group each reacted positively to the test. Among the 17 survivors in group 2 (treated with promin) the results in 15 were positive and in 2 negative. In group 3 (treated with promizole beginning six weeks after infection) the results in 11 animals were positive and in 7 negative. Among the 10 surviving animals in group 4 (treated with promizole starting ten

[8] All animals accepted for treatment had previously reacted to tuberculin injected intracutaneously.

[9] The test fluid, which was injected intracutaneously, was a 1:100 dilution of Old Tuberculin (Gilliland). The dose was 0.02 to 0.03 cc. Results were recorded forty-eight hours after injection.

weeks after infection) the reaction in 5 instances was positive and in 5 negative. Of the 10 surviving animals tested in group 5 (treated with promizole starting fourteen weeks after infection) the results in 6 were positive and in 4 negative.

Considering all of the animals that had received treatment with either drug and were living when the tuberculin tests were done, the tuberculin reaction was positive in 37 animals and negative in 18, or about 33 per cent. In a third (six) of the animals in which the tuberculin reaction was recorded as negative, subsequent gross and microscopical studies failed to demonstrate tuberculous lesions in the lungs, liver or spleen. In 3 additional animals in which tuberculin failed to elicit a reaction, the only signs of tuberculosis found were a single calcified nodule in the spleen of one and in the liver of another and a single atrophic fibrotic focus in the spleen of the third. Thus half (nine) of the animals that gave negative tuberculin reactions were devoid of any evidence of active tuberculosis.

Concentration of promizole in the blood: At the time of necropsy, specimens of blood from 17 of the animals in group 3 which had received promizole continuously for one hundred and eighty-four days were obtained direct from the heart for subsequent determinations of promizole and of haemoglobin. Prior to being killed with chloroform the animals were kept in their respective cages where the medicated feed was available. The supposition is that the animals had ingested feed containing the drug as usual during the day of death. The specimens of blood were oxalated and forwarded to Dr. L. A. Sweet and Dr. O. M. Gruhzit, Parke, Davis and Company, Detroit, Michigan, for the determination of promizole in the blood. The haemoglobin values were determined in our laboratory.

The average amount of free drug in the 17 specimens was 2.3 mg. per 100 cc. of blood. (In two specimens the tests revealed only a faint trace of the drug.) The average amount of the drug in the conjugated form was 2.8 mg. per 100 cc. of blood. Sixteen specimens of blood from animals in group 2 that had received promin continuously for one hundred and eighty-four days were also examined. The average amount of free drug in the specimens from group 2 was 3.8 mg. per 100 cc. of blood. The average estimation of total drug was 6.4 mg. per 100 cc. of blood.

Toxic effects of promizole: No pharmacological studies specifically designed to provide toxicological information on promizole were done. The observations concerning the toxicity of promizole were those made during the course of the two experiments which constitute the basis of this report. Our immediate interest was in determining the maximal dose of the drug that would be tolerated over a prolonged period without inducing serious untoward effects. The experience gained in the preliminary study was utilized in determining the dosage used in the second experiment.

Although with one possible exception none of the 20 guinea pigs in group 3, which had received promizole daily for one hundred and eighty-four days, died as a consequence of the drug, it was observed that during the last five weeks of medication the general condition of the animals that were receiving promizole was somewhat inferior to that of the comparable animals that were receiving promin. Although 3 of the animals in group 2 (promin) had died before the ex-

periment was terminated, most of the guinea pigs receiving promin continued to gain weight throughout the entire period of observation (two hundred and twenty-six days). Those receiving promizole did equally well for the first five months of treatment, after which about half of them failed to gain or in some instances actually lost weight. Since the amount of tuberculosis at the time of necropsy in group 2 (promin) and group 3 (promizole) was comparable, it is assumed that the changes noted in group 3 were related to the medicament. It should not be inferred, however, that the condition of the animals receiving promizole was critical. As a matter of fact, they appeared to have withstood any residual tuberculous infection and the prolonged administration of the drug definitely well. It was only by comparing the group receiving promizole with the group receiving promin that the impression was gained that, generally speaking, the condition of the group that received promin was better than the condition of the group that received promizole. The fact that no deaths that could be definitely attributed to the toxic effects of the drug occurred in group 3 indicates that in the dose used (200 to 225 mg. daily) guinea pigs, weighing 400 g. or more each, tolerate promizole given perorally quite satisfactorily.

The kidneys of all animals receiving promizole and living when the second experiment was ended were examined microscopically. In no instance were there morphological alterations suggestive of a toxic effect of the drug. In none of the other organs examined were there parenchymal changes indicative of toxic effects.

As mentioned previously (8), certain characteristic gross changes occur in the blood and spleen of guinea pigs receiving promin. The blood is darker than normal and the spleens become almost black and are slightly to markedly swollen. These changes were considered indicative of toxic effects. In the guinea pigs that received promizole the blood was perhaps slightly darker than normal but was without striking changes. At necropsy, 11 of 19 spleens in group 3 appeared normal in size and color, 4 were slightly dark and 4, although of normal color, were somewhat atrophic. Of all the effective sulfone drugs which we have studied, promizole had the least effect on the spleen.

Our colleague, Dr. G. M. Higgins, made a detailed examination of the blood of several animals in group 1 (controls), group 2 (treated with promin for one hundred and eighty-four days) and group 3 (treated with promizole for one hundred and eighty-four days).

The data obtained from the haematological studies were summarized for us by Doctor Higgins briefly as follows: In the animals that had received promin the total red cell count per cubic millimeter of blood had declined 1,600,000 $\pm$ 300,000[10] below the control level; that of the animals receiving promizole was 1,400,000 $\pm$ 400,000 lower than that of the controls. These are both significant differences. An increase of erythrocyte volumes indicated considerable macrocytosis which had ensued consequent to the stimulation of the haemopoietic centres. The mean red cell volume of animals which received promin was 25.5

[10] The figures included after the $\pm$ signs represent the probable errors of the means and not the standard errors.

± 1.1 cubic μ greater than that of the controls and that of animals which received promizole was 15.4 ± 2.6 cubic μ greater than that of the controls.

Concentrations of haemoglobin significantly lower than those of the controls were obtained in both experimental groups of animals. In those animals which received promin, the haemoglobin level was 1.5 ± 0.3 g. per 100 cc. of blood less than that of the controls, whereas in those that received promizole the haemoglobin level was 2.1 ± 0.3 g. less than that of the controls. There was no statistically significant difference between the concentration of haemoglobin of the animals receiving promin and those receiving promizole.

A greater degree of reticulocytosis obtained in animals given promin than in those which received promizole. In the normal group 1.2 ± 0.1 per cent of the red cells were reticulated. In those receiving promin, 10.7 ± 0.2 per cent of the red cells were reticulated, while in those receiving promizole 4.4 ± 0.3 per cent of all erythrocytes were reticulocytes. The data show clearly that, although some destruction of blood had occurred in the animals receiving the medicaments, it was not

TABLE 2

Comparative survival times of five groups of guinea pigs all inoculated subcutaneously on the same day with tubercle bacilli. Four groups were treated; one was not. Second experiment

GROUP	ANIMALS	DIED BEFORE MINIMAL TREATMENT (30 DAYS)	DAYS OF TREATMENT	SURVIVING AFTER 226 DAYS	
				Number	Percentage
1. Controls (not treated)	20	—	—	4	20
2. Promin (treatment after 6 weeks)	20	0	184	17	85
3. Promizole (treatment after 6 weeks)	20	1	184	18	90
4. Promizole (treatment after 10 weeks)	13	0	156	10	77
5. Promizole (treatment after 14 weeks)	15	3	128	10	67

of serious proportions and the regenerative capacity of the haemopoietic centres remained unimpaired.

Results of therapy: Survival time: The comparative survival times of the animals in the five groups are shown in table 2. Although 80 per cent of the untreated controls were dead when the experiment was terminated, only 13 (19 per cent) of all the animals in the other four groups had died. Among the 13 animals in groups 2, 3, 4 and 5 that died, 4 died either before treatment was started or before the lapse of a minimal treatment period of thirty days. It is an impressive fact that, while 80 per cent of the untreated animals had died, 86 per cent of the 64 animals that had received treatment for at least thirty days were living when the experiment was ended; this, regardless of the fact that no animal was treated until at least six weeks had elapsed after it had been inoculated with tubercle bacilli.

Although the percentage of animals living when the experiment was ended was greatest in the group that had been treated with promizole beginning six weeks after infection, the difference between this group and that treated with promin

was so small as to be of no significance. One point is worthy of mention, in group 2 (treated with promin) the 3 deaths occurred one hundred and eight, one hundred and seventeen and one hundred and forty days, respectively, after treatment had been begun, while in group 3, in which 2 deaths occurred, one animal died with extensive tuberculosis after receiving treatment for only eleven days. The second death in group 3 occurred on the two hundred and second postinfection day, one hundred and sixty days after treatment had been started.

As might be expected, the highest mortality among the treated animals occurred in group 4 and group 5, in which the beginning of treatment was delayed seventy days and ninety-eight days respectively after the animals had been inoculated with tubercle bacilli. However, even in these instances the difference in the percentage of survivors between the untreated controls and the animals that were treated is considerable and worthy of emphasis.

Amounts of tuberculosis in the respective groups: When the animals in the respective groups were examined at necropsy the manifestations of tuberculosis that could be discerned grossly were recorded. Although not a true index of the amount and character of tuberculosis present, the data, when recorded schematically, provide a useful means of obtaining quickly the comparative results in the different groups of animals. As mentioned previously, the tissues of predilection were prepared for microscopical examination. The data obtained from this portion of the study constitute the most reliable evidence as to what effect, if any, was obtained as a consequence of chemotherapy. It is our opinion that microscopical examination of tissue is an important aspect of any chemotherapeutic study of this type (6).

Group 1 (controls, not treated): The first death among the control or untreated animals occurred on the forty-fifth day after the animals had been inoculated with tubercle bacilli. It is assumed that the animal died as a consequence of a tuberculous infection, since the spleen contained a moderate number of tuberculous foci. The extent of the disease in the other 19 animals in this group varied, with one exception, from moderate to severe with extensive involvement of the spleen, lungs and liver in most instances. The one exception noted was one of the 4 control animals killed when the experiment was terminated. In this instance gross manifestations of tuberculosis were limited to caseous bilateral adenopathy of the axillary lymph nodes. Grossly and microscopically there were no detectable lesions in the parenchymal organs of this animal. The amount and distribution of tuberculosis in the 20 animals in group 1, recorded at the time of necropsy, are shown in figure 2.

Microscopically, with few exceptions, the disease in the untreated animals was typically that of inoculation tuberculosis in the guinea pig when the disease has been permitted to evolve in a natural manner. The lesions in the parenchymal organs were mostly of a soft, necrotizing character with marked replacement or destruction of the parenchymal elements as a consequence of the morbid process. Small to moderate sized cavities occurred in many of the lungs.

The minimal amount of tuberculosis present in one of the 4 survivors in group 1 (controls) was in marked contrast to the amount of disease in the other 19 ani-

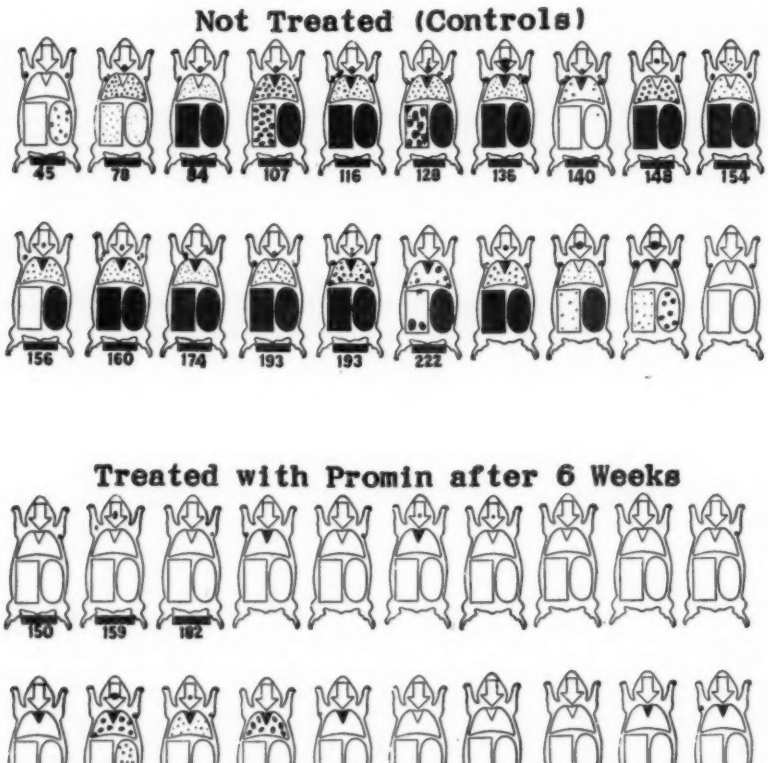


FIG. 2. (Top) Schematic representation of amount of tuberculosis observed grossly at necropsy of the animals in the untreated or control group. The number beneath an animal represents its length of life in days after inoculation.

FIG. 3. (Center) Comparison of amounts of tuberculosis observed at necropsy in untreated animals and in animals treated with promin; recorded schematically. The number beneath an animal represents its length of life in days after inoculation.

FIG. 4. (Bottom) Amounts of tuberculosis recorded schematically at necropsy in animals treated with promizole after six weeks. For comparison, note the amount of disease in the untreated control group. The number beneath an animal represents its length of life in days after inoculation.

mals of this group (figure 2). Although this animal had received a comparable amount of the same inoculum as the other animals in the experiment and was definitely sensitized to tuberculin at the time of necropsy, the infection had remained more or less localized in the lymph nodes contiguous to the site of inoculation.

As a group the untreated controls had an impressive amount of disseminated destructive tuberculosis, which provided a satisfactory basis of comparison with the amount of tuberculosis in the groups of guinea pigs that had received treatment. As may be noted in table 3, the average index of infection of the 20 untreated guinea pigs as determined by histopathological studies was 83.[11] As will be brought out subsequently, this was in striking contrast to the indices determined for the animals in the groups that received treatment.

TABLE 3

Average severity of tuberculosis in different anatomical situations expressed numerically. Data based on the histopathological characteristics of the tissues indicated. All animals inoculated subcutaneously on the same day with 0.0005 mg. of tubercle bacilli. Duration of experiment two hundred and twenty-six days. Second experiment

GROUP	DAYS OF INFECTION BEFORE TREATMENT	ANIMALS COMPUTED*	SPLEEN (MAX. 35)	LUNGS (MAX. 30)†	LIVER (MAX. 25)	SITE OF INOCULATION (MAX. 10)‡	AVERAGE INDEX OF INFECTION (MAX. 100)
1. Controls, 20 animals	—	20	29	25	19	10	83
2. Promin, 20 animals	42	20	1.6	6.5	0.25	2.5	10.8
3. Promizole, 20 animals	42	19	2.8	5.8	1.9	5.9	16.4
4. Promizole, 13 animals	70	13	8.6	7.2	4.2	5	25
5. Promizole, 15 animals	98	12	10.2	12.4	3.4	7.8	33.8

* In determining the numerical index of infection, those animals in the respective treated groups that died before treatment was started are not included.

† Includes involvement of tracheobronchial lymph nodes when no lesions were found in the lungs.

‡ Includes contiguous lymph nodes.

Group 2 (treated with promin starting six weeks after infection): The amount of tuberculosis present in this group at the time of necropsy is shown schematically in figure 3. It may be noted that, in this group, 3 animals had moderate to severe involvement of the lungs. In one of these animals the spleen also contained numerous tuberculous foci. Macroscopically no visceral lesions were found in 11 animals and in others the only indication of visceral tuberculosis was involvement of the tracheobronchial lymph nodes.

Microscopically, the effect of promin upon the course of the tuberculous infection was comparable to that described previously (8). With few exceptions lesions when present were minimal in number, were discrete and lacked the morphological characteristics associated with progressive, destructive tuberculosis. The average index of infection for the 20 guinea pigs treated with promin was 10.8 (table 3) (theoretic maximum, 100). Compared with 83, which was the average figure obtained for the 20 untreated animals, the difference is significant.

[11] Based on the theoretic maximal index of infection of 100.

Group 3 (treated with promizole starting six weeks after infection): Disregarding the one animal that died after receiving treatment for only eleven days, there were in this group 5 animals in which indistinct to definite tuberculous foci were recognizable grossly in the spleen. Three animals had grossly a few visceral changes of uncertain cause. Eleven animals were without gross visceral lesions in the spleen, liver or lungs, although in 9 of these the tracheobronchial lymph nodes were involved. The amount of tuberculosis recorded at necropsy for each of the animals in group 3 is shown schematically in figure 4.

Microscopically, lesions of tuberculosis were found in the spleens of 6 of the 19 guinea pigs that had received treatment for thirty days or longer. In one spleen the lesions were extensive and severe, in one minimal although progressive, and the lesions in the other 4 spleens were considered nonprogressive. The lesions in 2 of the latter were calcified (figure 5) and in one of these the only lesion found was so minute and atrophic as to make its tuberculous character quite atypical or uncertain. The lesions in the other 2 were discrete and epithelioid with varying degrees of fibroblastic evolution.

In 6 instances the liver contained lesions discernible microscopically. In 3 of the livers the disease, while considered progressive in character, was minimal in amount. The disease in the other 3 livers was presumably nonprogressive and the lesions were few (figure 6).

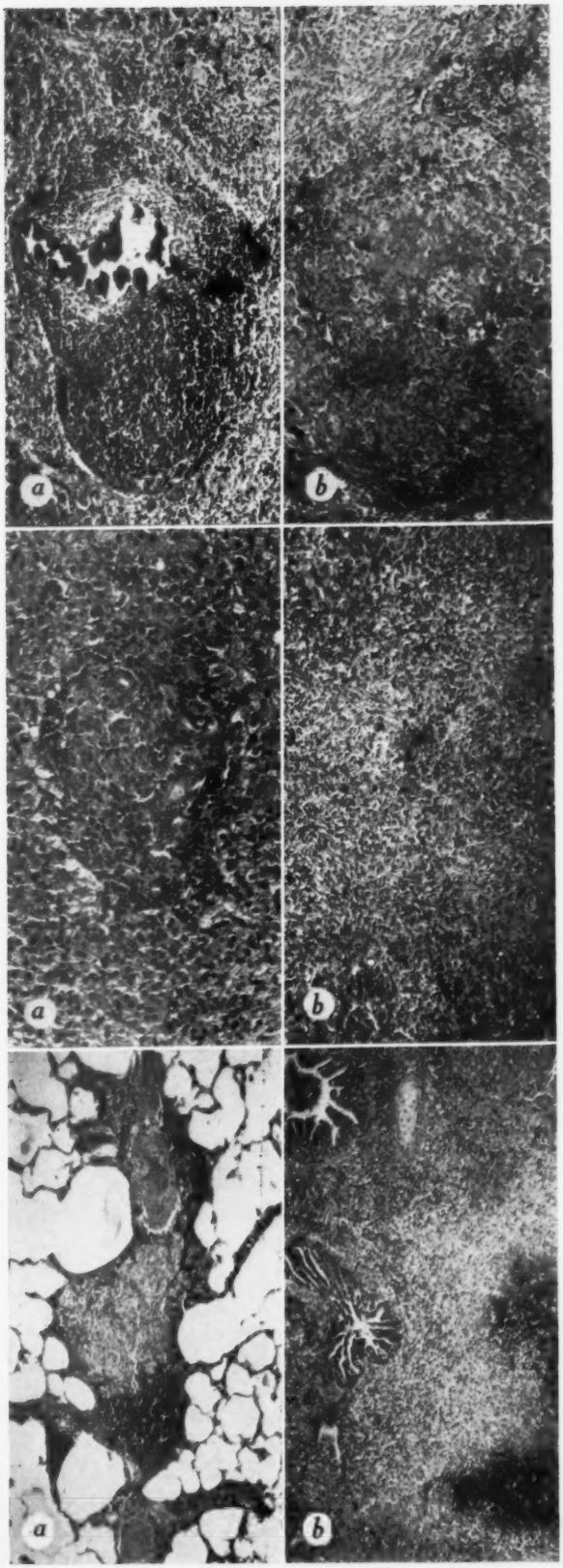
In 8 of the guinea pigs tuberculosis was found in the lungs. In only one instance, however, was the disease in the lungs more than minimal in amount.[12] In 2 animals the lesions in the lungs were exceedingly few. They were small, discrete, nonnecrotizing epithelioid nodules that were apparently nonprogressive (figure 7). In 3 instances in which no lesions were found in the parenchyma of the lung the associated tracheobronchial lymph nodes contained active disease. This fact might be interpreted as indicating the presence in the lung also of tuberculous lesions although none were demonstrated. In 5 additional instances in which tuberculous changes were not found in the lungs, nonprogressive markedly fibrotic involvement of the tracheobronchial lymph nodes occurred.

[12] In this instance the lesions in the spleen and liver were also progressive and destructive.

FIG. 5. (Top) *a*. Calcified nodule in spleen of guinea pig treated one hundred and eighty-four days with promizole (×75). *b*. Severe necrotizing tuberculosis in the spleen of an untreated control guinea pig (×56). Both animals killed two hundred and twenty-six days after inoculation with tubercle bacilli.

FIG. 6. (Center) *a*. Solitary, discrete, presumably nonprogressive tubercle in liver of a guinea pig treated with promizole for one hundred and eighty-four days. The animal was killed two hundred and twenty-six days after inoculation with tubercle bacilli (×112). *b*. Area of progressive destructive tuberculosis in the liver of an untreated guinea pig. The animal died one hundred and ninety-three days after inoculation with tubercle bacilli (×56).

FIG. 7. (Bottom) *a*. Discrete tuberculous nodule composed of small conglomerate epithelioid tubercles, from lung of guinea pig treated one hundred and eighty-four days with promizole. The animal was killed two hundred and twenty-six days after infection (×60). *b*. Large region of progressive tuberculosis in the lung of an untreated guinea pig that died one hundred and ninety-three days after infection (×60).



FIGS. 5–7

In 11 of the guinea pigs what appeared to be active tuberculosis was found in the tissues at the immediate site of inoculation or in the contiguous lymph nodes. In 2 additional animals the disease in these situations was definitely nonprogressive.

The index of infection for the animals in group 3 expressed numerically was 16.4 (table 3). If the index of infection determined for the disease at the site of inoculation and contiguous to it, which was 5.9, is subtracted from the total, the index of infection for the liver, spleen and lungs in group 3 would be 10.5. The figure for the liver, spleen and lungs only of the group treated with promin is 8.3. For the same organs of the animals in the untreated group the index of infection would be 73.

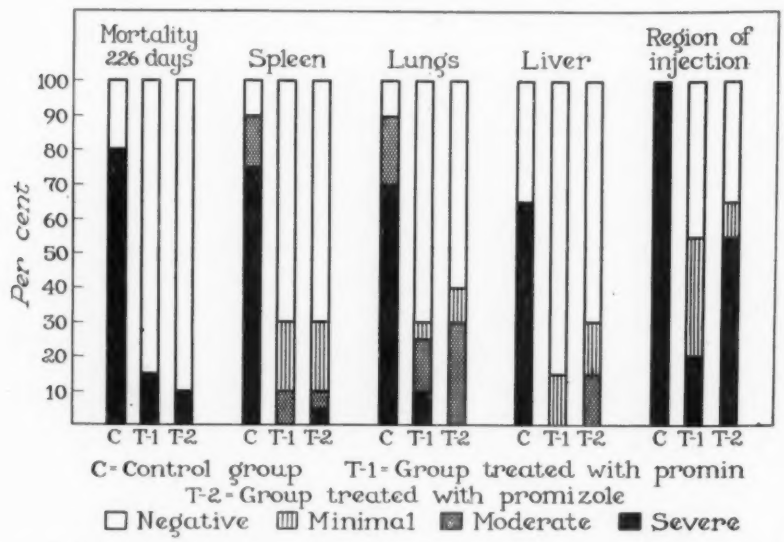


FIG. 8. Relative amounts of tuberculosis determined microscopically in two groups of treated and in the group of untreated guinea pigs.

The relative percentages of minimal, moderate and severe tuberculosis in the animals in the control group compared with the disease in the animals that were treated with promin and with promizole starting six weeks after infection are shown graphically in figure 8.

Group 4 (treated with promizole starting ten weeks after infection): At the time of necropsy tuberculosis in one or more of the visceral organs of predilection was noted in 7 of the 13 animals. In 2 of the animals the disease was widely distributed and severe. In the other 6 animals no visceral tuberculosis was recorded; however, in 3 of these the tracheobronchial lymph nodes were affected (figure 9).

Microscopically, lesions of tuberculosis were found in the viscera of 8 of the 13 guinea pigs in this group and in 7 of the 8 the disease in one or more organs was moderate to severe. Tuberculosis was not found in either the liver, spleen or

lungs of the remaining 5 animals. The lesions in many of the animals of this group showed impressive morphological evidence of regression. Lesions with well advanced fibroblastic changes were frequent and in a few of them calcification had occurred (figure 10). While the deterrent effect of the treatment was inferior to that observed in group 2 and group 3, the numerical index of infection, which was determined to be 25, contrasted favorably with that of the untreated controls (table 3).

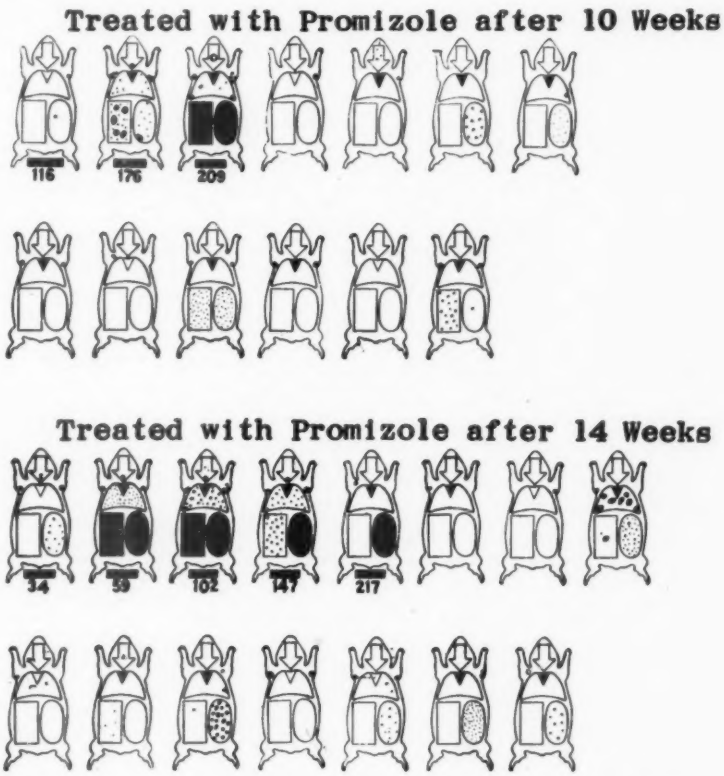


FIG. 9. Amount of tuberculosis recorded schematically at the time of necropsy of the groups of animals in which treatment with promizole was delayed ten and fourteen weeks respectively after the animals had been inoculated with tubercle bacilli. Compare with figure 2. The number beneath an animal represents its length of life in days after inoculation.

Group 5 (treated with promizole started fourteen weeks after infection): It may be recalled that there were 15 animals in this group at the time of inoculation with tubercle bacilli. When treatment was started fourteen weeks later, 2 deaths had occurred. One additional death was recorded four days subsequent to beginning of treatment. If these 3 animals are disregarded there were, when the experiment was terminated, 8 guinea pigs in which visceral tuberculosis was observed grossly. The extent of the disease varied from minimal to severe. Four animals were without recognizable signs of visceral involvement (figure 9).

The microscopical findings were fairly consistent with the gross findings at necropsy. In 6 of the 12 animals the amount of disease was considerable. Among the remaining 6 there were 3 in which the disease in the visceral organs was minimal or nonprogressive. No lesions of tuberculosis were found in the liver, spleen or lungs of the 3 remaining guinea pigs. The index of infection of the 12 animals in group 5 that had received treatment was 33.8.

Morphological evidence of a deterrent effect upon the course of the tuberculosis was readily recognized in the histopathological study of the tissues. Regions of fibrosis with calcification were noted in the spleen (figure 11) and lung. Discrete atrophic or hard tubercles were also found.

Although there was definitely more tuberculosis of a progressive character in the animals in group 5 than was true in any of the other groups of animals that were treated, there was appreciably less disease in this group than among the animals in the control or untreated group. It is apparent, however, that the effectiveness of the treatment diminished as the beginning of treatment was delayed. It is somewhat surprising that such advanced disease could yield to treatment at all.

Residual infection: We had previously observed that virulent tubercle bacilli may be latent in the tissues of guinea pigs treated for a prolonged period with promin (8); this regardless of the fact that tissues containing the virulent tubercle bacilli were frequently without demonstrable lesions of tuberculosis. Medlar and Sasano (11) also investigated this phase of the problem, extending and confirming our observations.

At the time of necropsy half of the spleen from each of 14 guinea pigs that had been treated with promizole for one hundred and eighty-four days (group 3) was ground and suspended in physiological solution of sodium chloride. Each of the 14 splenic suspensions was used for subcutaneous inoculation of 2 additional normal guinea pigs. None of the 14 spleens from which the inoculations were made had lesions of tuberculosis discernible grossly. Microscopically, 2 spleens contained well encapsulated calcified nodules, 2 had small "hard" tubercles that were considered nonprogressive and in 10 no tuberculous lesions were found. The 28 animals inoculated with the 14 splenic suspensions were killed eight weeks after inoculation and examined for tuberculosis. Of the 14 splenic emulsions inoculated into normal guinea pigs, 10 induced tuberculosis in the spleen, liver or lungs of one or both of the 2 recipients. Four of the emulsions failed to induce demonstrable tuberculosis in either of the 2 recipients inoculated. It was of interest to note that 6 of the 10 splenic suspensions which proved infective for normal guinea pigs produced tuberculosis in only one of the 2 guinea pigs receiving the respective inoculations.

This phase of the study indicates that promizole, although capable of inducing a striking reduction of the amount of tuberculosis in experimentally infected guinea pigs, did not eliminate all tubercle bacilli nor render them avirulent. That only 4 of the spleens from the animals previously treated with promizole proved infectious for each of the 2 normal guinea pigs inoculated with the respective emulsion suggests that the tubercle bacilli were exceedingly few or that they

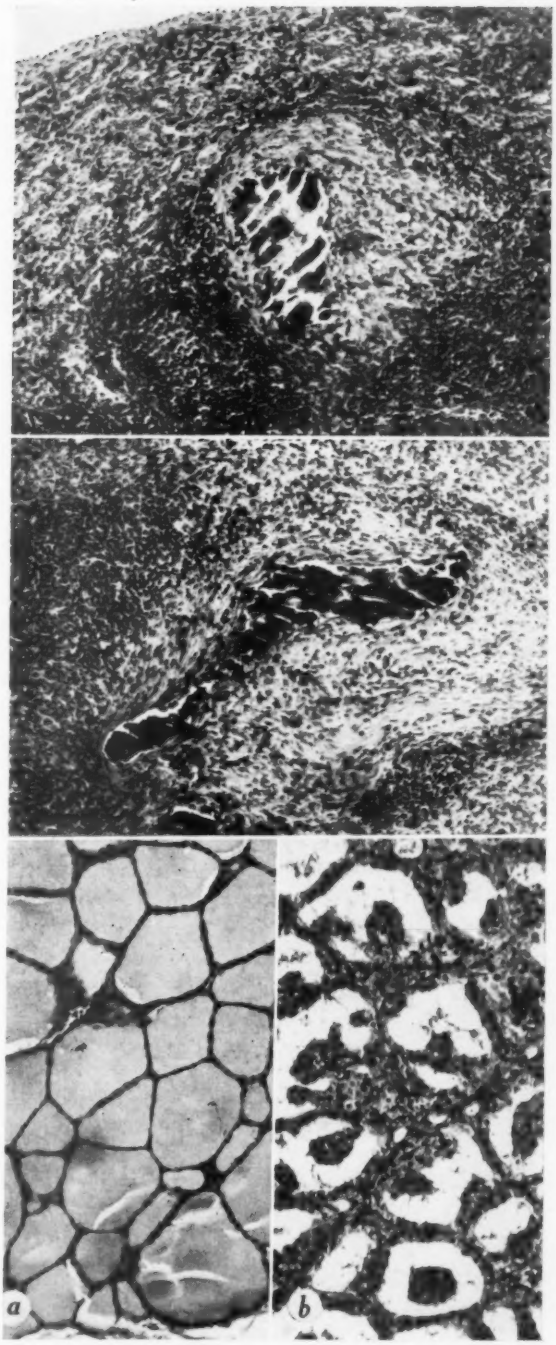


FIG 10. (Top) Tuberculous nodule with calcification in the spleen of a guinea pig treated with promizole one hundred and fifty-six days. The animal was killed two hundred and twenty-six days after inoculation with tubercle bacilli (×98).

FIG. 11. (Center) Calcified, fibrotic nodule in the spleen of a guinea pig treated with promizole for one hundred and twenty-eight days. The animal was killed two hundred and twenty-six days after inoculation with tubercle bacilli (×90).

FIG. 12. (Bottom) *a*. Thyroid of untreated guinea pig (×56). *b*. Thyroid of guinea pig that received promizole in the feed for one hundred and eighty-four days (×56). Both animals were killed two hundred and twenty-six days after being inoculated with tubercle bacilli.

were of reduced virulence. Furthermore, that 4 (29 per cent) of the 14 spleens from the animals that had been treated were presumably devoid of tubercle bacilli capable of infecting the highly susceptible guinea pig is worthy of emphasis. The results suggest that complete elimination of virulent tubercle bacilli by a therapeutic agent may eventually be possible of accomplishment and that the ultimate objective, which is to render the tissues free of virulent tubercle bacilli, should be the goal of future investigations. While we can report some progress in this direction, the goal is far from realization. It might appear that the drug has some direct or indirect effect upon bacterial reproduction and is not a lethal agent *per se*.

Effect on the thyroid: Of much interest was the enlargement of the thyroid gland in the animals that had received promizole. The effect was consistent in that it had occurred in each of the 19 guinea pigs in group 3.[13] Eighteen of these animals had received promizole in their feed daily for one hundred and eighty-four days; one had received the drug for one hundred and sixty days. The effect on the thyroid did not occur among the animals in the control group or among the animals that had received promin.

The hypertrophy was striking in some instances. In the largest specimen, the greatest dimensions of each lobe after fixation were 1.9 by 0.9 cm. By comparison the lobe of a normal thyroid measured 0.6 by 0.3 cm.

Microscopically, the affected thyroids showed diffuse parenchymatous hyperplasia, characterized by an increase of the height of the alveolar epithelium, intraälveolar papillary projections and absence or decrease of colloid (figure 12).[14]

In order to determine whether the changes in the thyroid when once established would persist if the administration of promizole was stopped or whether the changes were reversible when administration of the drug was discontinued, another study was done. A series of presumably normal guinea pigs was divided into two groups and housed in an iodine-free environment. All animals received the same feed, which consisted of rabbit chow, supplemented twice weekly with uncooked cabbage. Promizole to the amount of 1 per cent by weight was added to the feed of one group. The other did not receive any promizole.

After the animals had been receiving promizole for variable periods, one of us (F. C. M.) removed surgically, while the animal was under ether anaesthesia, one lobe of the thyroid. The administration of promizole was discontinued after partial thyroidectomy and the remaining lobe of the thyroid was removed at an interval of five to thirty-six days after administration of the drug had been discontinued. The thyroids were examined microscopically.

It was found that readily recognizable signs of hyperplasia were present after fifteen days of medication. Colloid was present but the alveolar epithelium was greatly increased in height and in some instances had filled the alveolar spaces

[13] A similar goitrogenic effect also occurred among the animals in groups 4 and 5.

[14] Essentially the same changes had been previously noted by our colleague, Doctor Higgins, in rats to which promizole had been administered. Doctor Higgins and his associates are now engaged in an extensive study of the goitrogenic properties of promizole.

partially or completely. After thirty-seven days of medication the microscopical appearance of the thyroid was striking. The colloid had practically disappeared and the morphological pattern of the gland was grotesque, owing to the irregular shape of the alveolar spaces and the protrusion into many of the spaces of projections of epithelial cells. A few epithelial cells showed mitotic division. There was, however, no suggestion of a malignant neoplastic change.

Five days after administration of the drug had been discontinued following fifty-two days of medication, the gland was still hyperplastic and the only recognizable reversible changes were the appearance in the alveolar spaces of a pale staining, homogeneous substance, presumably colloid, and an enlargement of the alveoli. Restoration toward the normal was more apparent at fifteen days and twenty-one days after the drug had been withdrawn from the animal's feed. Thirty-six days after the medication had been discontinued the glands were essentially normal morphologically.

These observations indicate definitely that the changes in the thyroid which follow the oral administration of promizole to guinea pigs are reversible.

COMMENT

In promizole we have another chemical substance which was capable, under the conditions imposed, of a striking and desirable effect on the course of experimental tuberculosis in guinea pigs. Under the influence of the drug, tuberculosis which had been established weeks before treatment was instituted was changed from a progressively destructive disease to one in which the morbid process was retarded or arrested and in which lesions regressed or were resolved. The therapeutic effects of promizole were also apparent from the comparative percentages of survivors in the treated and untreated groups of animals.

Promizole is chemically quite unlike any of the drugs which have been described previously as having tuberculotherapeutic properties. Chemists will note immediately that the basic structure of promizole is such that it might represent the beginning of an entirely new series of compounds by substitution of various radicals on either or both of the NH_2 groupings. Similar substitutions upon the sulfanilamide molecule have resulted in such compounds as sulfapyridine, sulfathiazole, sulfadiazine, sulfaguanidine and the various other sulfonamide compounds, which have special properties.[15] These side chains have increased the efficacy of sulfonamide compounds and have decreased their toxicity. In a similar manner, 4,4′-diaminodiphenylsulfone has been modified to yield such compounds as promin and diasone. Promin and diasone are essentially alike, except that the two molecules of glucose which enter into the promin molecule are replaced in diasone by two molecules of formaldehyde and that the sodium sulfonate and sodium sulfoxylate groups represent different valences of sulfur. It seems probable that the tuberculo-chemotherapeutic activity of promin and diasone may be dependent upon their breaking down to diaminodiphenylsulfone or a similar compound.

[15] Recently McClintock and Goodale (12) reported on the *in vitro* and *in vivo* effects of a potassium salt of sulfapyridine—choleate complex. The results indicated that the compound exerted an inhibitory effect on the tubercle bacillus.

However, in the case of promizole this breakdown to a diphenylsulfone nucleus cannot occur. We have studied a large series of compounds derived from 4,4′-diaminodiphenylsulfone. Those which have been very active against experimental tuberculosis of guinea pigs have without exception been compounds which may possibly owe their efficacy to a breakdown to a simpler diphenylsulfone compound. Much interest is therefore directed to promizole, which represents a departure from previous experience in this regard. The relation between promizole and sulfathiazole is also of interest and it will be noted that the compounds are isomers. If the thiazole ring in figure 1 be rotated 180 degrees and the SO_2 be linked to the thiazole ring through the NH_2, sulfathiazole will be the result. The rearrangement of this molecule profoundly affects the chemical, pharmacological and therapeutic properties of the two substances. Evidence is accumulating to show that in the human body metabolism, conjugation and excretion are also profoundly dissimilar.

While the results of our studies appear to establish promizole as an agent capable of a considerable deterrent effect on experimental tuberculosis in guinea pigs, it is likewise evident that at the present time neither this nor any other compound subjected to a crucial assay *in vivo* has been able to accomplish therapeutically what might be considered the ultimate in effectiveness.

Although opinions may vary as to what constitute the critical requirements for the perfect chemotherapeutic substance for combating tuberculous infections in guinea pigs, the following are suggested: (*1*) The agent should be well tolerated and should not induce critical physiological derangements. (*2*) The substance should reverse a well established inoculation tuberculosis, induced by a virulent strain of human tubercle bacilli, from a progressive, irreversible destructive process to one that is nonprogressive and which eventually will resolve, fibrose or calcify. The obvious consequence of this effect would be an extended longevity of the treated animals. (*3*) The agent should eliminate or render avirulent tubercle bacilli in the organs of predilection such as the liver, spleen and lungs and hence preclude subsequent activity of possible latent infections. (*4*) The desirable results should be achieved within a reasonable period.

None of the drugs which we have tested, including 4,4′-diaminodiphenylsulfone, promin, diasone and promizole, have been able to satisfy all of the foregoing requirements. Promizole, which is the subject of this report, fulfills certain of the demands fairly well but was found deficient, as were the other drugs tested, in eliminating or rendering ayirulent tubercle bacilli from the spleens of all animals treated. However, the fact that virulent tubercle bacilli were not demonstrated in 4 of 14 spleens subjected to animal inoculation tests indicates that this requirement may be met in the future by some new and more effective substance. The search for such an agent is continuing. As long as virulent tubercle bacilli persist in the tissues of animals after treatment, even though the therapy has affected profoundly the morphological aspects of the infection, it must be concluded that the therapeutic agent lacks qualities essential for the ideal tuberculochemotherapeutic substance.

One of the interesting differences in the relative effectiveness of promizole and promin was the greater ability of promin to cope successfully with involvement of the tracheobronchial lymph nodes. The significance of this is not entirely obvious, since the actual amount of active tuberculosis demonstrable in the lungs in the group that received promizole for one hundred and eighty-four days was less than in the group treated with promin for the same length of time.

The results of treatment in the two groups in which treatment with promizole was delayed ten and fourteen weeks, respectively, after the animals had been inoculated are of interest, not because of the fact that the treatment was less effective than in the group in which treatment was started six weeks after inoculation but rather because of the fact that desirable results of any magnitude were obtained. The fact that a therapeutic agent can influence, even slightly, the usual irreversible course of tuberculosis established in guinea pigs more than three months before treatment was started, provides reasons for believing that the possibilities for obtaining eventually a substance of much greater effectiveness than any known at this time are promising.

In the meantime we should maintain an unprejudiced but critical attitude to the end that no likely substance is discarded unless found deficient by adequate *in vivo* tests and that no substance, however promising, be used in treating human beings unless its safety and effectiveness have been amply established by animal experimentation.

The striking hyperplasia of the thyroid gland in guinea pigs produced by administration of promizole is probably similar to that produced by a variety of goitrogenic agents. A recent review of this subject by Rawson, Hertz and Means (13) mentioned that thyroid hyperplasia may be produced in experimental animals by such compounds as thiocyanates, cyanides, sulfonamide compounds (especially sulfaguanidine) and compounds related to thiocarbamide and thiourea. Goitrogenic properties are also possessed by such foods as soy-bean flour and the leaves and seeds of plants belonging to the cabbage family. It appears that these substances probably act by blocking the production of active thyroxin and that the thyroid hyperplasia is a physiological hypertrophy in a vain effort to supply an adequate quantity of the hormone. The basal metabolic rate of animals that have such goitres is below the normal level despite the enlarged thyroid with histological appearances resembling that of a hyperfunctioning goitre.

The production of goitres in human beings by the foods and drugs mentioned in the preceding paragraph is very rarely observed and when observed can be controlled readily. Potassium thiocyanate, a drug widely used to control essential hypertension in man, has produced goitres in very rare instances after prolonged administration. In these instances the changes in the thyroid have been reversed readily when administration of the drug was discontinued or when iodine or thyroid was administered. These goitrogenic properties of potassium thiocyanate have not hampered the clinical applications of this drug. Preliminary studies have been made on administration of promizole to human beings and no adverse effects upon the thyroid gland have been observed. At the pres-

ent time our incomplete observations lead us to predict that the goitrogenic properties of promizole for guinea pigs are not likely to interfere with the clinical application of this drug, should it prove to have any beneficial effects.

SUMMARY

The results of two *in vivo* tests to determine the efficacy of a new sulfone compound, 4,2′-diaminophenyl-5′-thiazolylsulfone (promizole) are reported. In the first experiment, which was of sixty days' duration, promizole was compared in effectiveness with 4,4′-diaminodiphenylsulfone. The respective drugs were administered perorally with the feed, administration being started several days before the guinea pigs, including a group of untreated controls, were inoculated subcutaneously with human tubercle bacilli (strain H37RV). The relative effectiveness of the two compounds was determined by histological examination of the spleen, liver and lungs. In comparing the results with the tuberculous changes in the untreated group, the deterrent effects of the drugs on the development of the disease were definite and convincing and appeared to warrant a more extensive and crucial study of the new compound.

In the second experiment, five groups of guinea pigs, totaling 88 animals, were utilized. Each animal was inoculated subcutaneously with 0.000,5 mg. of the same strain of tubercle bacilli used in the first experiment. The therapeutic efficacy of promizole was compared with that of promin (sodium p,p′-diaminodiphenylsulfone-N,N′-didextrose sulfonate). The respective groups of animals were as follows: group 1, 20 animals, not treated; group 2, 20 animals treated with promin starting six weeks after infection; group 3, 20 animals treated with promizole starting six weeks after infection; group 4, 13 animals treated with promizole starting ten weeks after infection; and group 5, 15 animals treated with promizole starting fourteen weeks after infection. The drugs were administered with the feed, which for group 2 contained 1 per cent by weight of promin while the proportion by weight of promizole for most of the period of medication was 0.5 per cent. All animals surviving on the two hundred and twenty-sixth day after inoculation with tubercle bacilli were killed for necropsy. Eighty per cent of the untreated controls died during the period of observation as compared with 19 per cent of the animals in the four groups that received treatment. Tissues of all of the animals were examined microscopically and the numerical index of infection was determined for each group.

The following conclusions are drawn:

1. The chemical compound, 4,2′-diaminophenyl-5′-thiazolylsulfone (promizole) is well tolerated by tuberculous guinea pigs. It produces moderate blood dyscrasia which is temporary and reversible.

2. The drug was capable under the conditions of the experiment of exerting a markedly favorable influence upon a tuberculous infection established weeks before treatment was started.

3. Promizole exerted a deterrent effect that was but slightly inferior to that of promin even though the daily dose of promizole was only half that of promin.

4. Although of considerable effectiveness in combating tuberculosis in guinea

pigs, promizole, like 4,4′-diaminodiphenylsulfone, promin and diasone, does not meet all of the critical requirements for the perfect tuberculo-chemotherapeutic agent.

5. Promizole in guinea pigs is a potent goitrogenic agent producing diffuse parenchymatous thyroid hyperplasia which is reversible.

6. The low toxicity of promizole for human beings and the tuberculo-chemotherapeutic properties of the drug in experimentally infected guinea pigs appear to justify its clinical trial.

SUMARIO

Preséntase el resultado de dos ensayos *in vivo* que se proponían determinar la eficacia de un nuevo compuesto sulfónico, 4,2′-diaminofenilo-5′-tiazolilosulfona (promizol). En el primer experimento que duró 60 días comparóse la eficacia del promizol con la de la 4,4′-diaminodifenilsulfona. Ambas drogas fueron administradas por vía bucal con la comida, iniciándose varios días antes de inocular subcutáneamente a los cobayos, incluso un grupo de testigos no tratados con bacilos tuberculosos humanos (cepa H37RV). Determinóse la eficacia relativa de los dos compuestos mediante el examen histológico del bazo, hígado y pulmones. Al comparar el resultado con las alteraciones tuberculosas sobrevenidas en el grupo no tratado, el efecto adverso de las drogas sobre el desarrollo de la enfermedad fué bien definido y convincente y pareció justificar un estudio más completo y extenso del nuevo compuesto.

En el segundo experimento utilizáronse 5 grupos de cobayos, formando un total de 88 animales. Cada animal fué inoculado subcutáneamente con 0.000,5 mg. de la misma cepa del bacilo tuberculoso utilizado en el primer experimento. Comparóse la eficacia terapéutica del promizol con la de la promina (p,p′-diaminodifenilsulfona-N, n′-bidextrosa sulfonato de sodio). Los grupos respectivos de animales estaban compuestos así: grupo 1, 20 animales no tratados; grupo 2, 20 animales tratados con promina a partir de seis semanas de la infección; grupo 3, 20 animales tratados con promizol a partir de seis semanas de la infección; grupo 4, 13 animales tratados con promizol a partir de diez semanas de la infección; y grupo 5, 15 animales tratados con promizol a partir de catorce semanas de la infección. Las drogas fueron administradas con la comida, la cual en el grupo 2 contenía 1 por ciento por peso de promina, en tanto que la proporción por peso del promizol fué de 0.5 por ciento en la mayor parte del período de medicación. A todos los animales que sobrevivieron los doscientos veintiséis días de la inoculación con bacilos se les mató para hacer la autopsia. Ochenta por ciento de los testigos no tratados murieron durante el período de observación comparado con 19 por ciento de los animales de los cuatro grupos tratados. Los tejidos de todos los animales fueron examinados al microscopio y se determinó en cada grupo el índice numérico de infección.

Sácanse las siguientes conclusiones:

1. El compuesto químico 4,2′-diaminofenilo-5′-tiazolilosulfona (promizol) es bien tolerado por los cobayos tuberculosos, produciendo una hemodiscrasia moderada que es temporal e invertible.

2. En las condiciones del experimento la droga se mostró capaz de ejercer un influjo decididamente favorable sobre una infección tuberculosa establecida semanas antes de iniciar el tratamiento.

3. El promizol ejerció un efecto inhibidor que apenas fué inferior al de la promina aunque la dosis diaria del primero sólo era la mitad de la de la última.

4. Aunque mostró considerable eficacia contra la tuberculosis en el cobayo, el promizol, lo mismo que sucede con la 4,4′-diaminodifenilsulfona, la promina y la diasona, no cumple todos los requisitos capitales que debe poseer el perfecto agente tubérculoquimioterapéutico.

5. En el cobayo el promizol es un poderoso agente bocígeno que produce una hiperplasia tiroidea parenquimatosa difusa que es invertible.

6. La poca toxicidad del promizol para el hombre y sus propiedades tuberculoquimioterapéuticas en el cobayo infectado experimentalmente parecen justificar su ensayo clínico.

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BOOKS

ARNOLD B. RICH: *The Pathogenesis of Tuberculosis. Pp. xxiv + 1008, with 89 figures and 20 tables, Charles C Thomas, Springfield, Illinois—Baltimore, Maryland, 1944, cloth, $10.50.*

By MAX PINNER

Doctor Rich correctly states in the preface that "There exists no unified, modern critical survey of the state of our knowledge concerning the fundamental principles of tuberculosis and the factors which influence the disease." This defines Doctor Rich's aim. In addition, he wished "to examine carefully the evidence relating to those matters and, from that analysis, to attempt to define clearly the present limits of our knowledge. . .; and, finally, to attempt to accomplish this survey in a manner that will correlate into a unified whole the basic, interdependent, but at present often isolated, facts that have been given to us by bacteriology, immunology, pathology, clinical observation, experimental investigation, epidemiology and genetics."

This is an ambitious undertaking; one that, undoubtedly, many a worker in the field of tuberculosis has dreamed of doing for himself; one for which every worker in this field will feel deep gratitude to Doctor Rich for having done it, for having done it so well and with such eminent thoroughness.

There are probably only two books in the field of tuberculosis which contain a similar collection and digestion of fundamental facts. The first, *La tuberculose et son bacille* by I. Straus which was published in 1895 and which is still an amazingly fertile source for basic information. The second is Calmette's *L'infection bacillaire et la tuberculose*, the fourth edition (revised by Bouquet and Nègre) of which appeared in 1936 and, unfortunately, never found the wide distribution in this country which it deserves because it is not translated.

Doctor Rich's book is not only the successor to two illustrious books, but it adds a quality and an attitude which its forerunners lack. It is—as they are—not only an orderly collection of data with some discussion of their significance, but it is a profound analysis in which (I find no better word) a passionate urge for clarity and understanding is the motivating principle. The result is a book which, as a whole, far surpasses in interest and value any previous (non-monographic) study in tuberculosis which I know.

The method by which Doctor Rich proceeds is to assemble the known and published facts concerning a given problem; to submit them (and the conclusions derived from them) to a rigid—and, at times, somewhat harsh—scrutiny for their validity; to adduce wherever possible auxiliary or circumstantial evidence; to show the completeness of the available knowledge or its deficiencies; to pronounce his definitive conclusion or to indicate that final deductions are not warranted by the present state of our knowledge and, thus, to formulate existing unsolved problems. It all is a rigid exercise in the judging of validity of evidence and in clear, logical thinking. The intellectual discipline that Doctor Rich used

in the writing of this book, he enforces on the reader; this is a highly stimulating mental experience which is not often to be had from medical treatises.

But to praise fully and unstintingly does not preclude disagreements in opinions and criticism of method. The former are unimportant and are mainly based on differences in interpretation and evaluation of evidence. One worker may choose to assign more relevance to certain data than Doctor Rich does. This—as just one example—applies to the work (mainly by Lurie) on the constitutional heredity as one pathogenic factor the importance of which, in my judgment, Doctor Rich underestimates. One's opinion in this matter influences many immunological, clinical and epidemiological conclusions. Gerstl's work on enzymatic mechanisms in native resistance has probably opened new approaches, but Doctor Rich does not mention it.

More important than divergencies of opinion regarding single items is, as mentioned, criticism of methodological procedures. As stated in the preface, facts derived from experimental, morphological and clinical investigation are analyzed. But the main weight rests on experimental pathology. Accordingly, the chapters on *Native Resistance*, *The Mechanism of Local Tissue Resistance*, *Hypersensitivity*, *Desensitization* and *The Mechanism of Acquired Resistance* are the richest in informative analysis. The closer the subject remains to the test-tube and the experimental animal, the more masterly is the presentation; the closer it comes to pathological processes in man and to clinical phenomena, the more one finds invitations and provocations for possible criticism and the weaker is the persuasive force of some of the conclusions.

It seems regrettable, but quite understandable, that Doctor Rich has chosen experimental evidence as the most conclusive: this assures the highest degree of scientific argument, but lessens the pragmatic value. If more data from morphological studies in man and from clinical and roentgenological observations had been used, the immediacy of these fundamental discussions as a basis for the understanding of human tuberculosis would have been more obvious. One may wonder why Doctor Rich does not use roentgenology as the most important morphological tool *in vivo*. As it is, the reader must frequently take unaided the step—or steps—between the topics discussed and their practical application in clinical medicine. Doctor Rich seems to have more confidence than this reviewer that many readers will spend the effort to accomplish this successfully.

As examples of some of the less convincing arguments, one may point out that the brief discussion on the clinical significance of blood counts in tuberculosis is not critical; that the attempt in chapter 18 to correlate age-specific resistance to age-specific mortality is unconvincing (and probably methodologically incorrect); that it is not a fair and complete representation of the theory of "endogenous reinfection" to confine it to "reanimation" of the primary complex proper (it is endogenous reinfection, or, better, exacerbation, regardless of whether the bacilli are derived from the primary complex itself or from other bacillary depots created during or shortly after the primary phase); that figures 73, 74 and 75, presented as evidence for the apical onset of phthisis, are not convincing without

a much more detailed morphological analysis. These are a few examples. They simply show that Doctor Rich is either not deeply interested or not a believer in the documentary value of morphological and clinical studies. The intensity of the author's interest, and not his knowledge, determines on which topics Doctor Rich's "passionate urge for clarity and understanding" is centered and which are treated as but of marginal interest. It is, of course, the author's privilege to make that choice, as it is the reviewer's privilege to express his regret or disappointment with certain choices.

There are some interesting sections on the morbid anatomy in man, but they appear as appendiceal structures, and this whole subject has not received the thoroughly searching treatment of other parts; the established data are but little discussed or analyzed, so that the fundamental work of Ghon, Aschoff and his school, Schürmann, Terplan receives but incidental mention. Ranke's work is briefly referred to, but what is said about it is neither a correct summary of the work nor a pertinent refutation. Ranke's work has had such a profoundly stimulating effect on research in tuberculosis that any analyst of these matters must deal with it, accept or refute it; but none can afford to ignore it, which, for all practical purposes, Doctor Rich does. The author's lack of interest in morphological and clinical matters is indicated by the fact that cavity formation and cavity healing and resolution of infiltrative lesions are hardly mentioned; the words cavity, resolution, absorption, resorption, ulceration, healing do not appear in the extensive subject index.

In the final chapter on epidemiological features, the deficiency of anatomical and clinical interest is apparent. This chapter clearly shows that it is impossible to form a well balanced and valid concept of the epidemiological development of tuberculosis by restricting the analysis to the happenings during the last four decades in a restricted geographical area. A full concept must be based on the obvious fact that tuberculosis has most revealing temporal and spatial dimensions. The lack of such a broad concept explains the inaccurate implication that "the phenomenal precipitous fall in the mortality rate that has occurred within a scant two generations" (that is, in this century) is the first spectacular decline in tuberculosis, while the evidence (which is quoted in other connections) makes it clear that the most precipitous decline of tuberculosis—wherever pertinent data are in hand—has occurred in much earlier phases of the epidemic.

But it must be reëmphasized that the criticism voiced in the last paragraphs applies to sections of the book that, by the author's deliberate choice, are treated as matters of marginal interest.

In contrast, the largest portions of the book, devoted to principles of native resistance and acquired immunity, are masterful. In these sections the discussion is not confined to tuberculosis but embraces broad biological principles, crystallized from the investigations of other infectious diseases. This adds interest and validity as well.

In the immunological chapters, Doctor Rich has clarified an old argument. He and his associates have claimed in former publications that allergy and immunity can be dissociated, a claim that was never proved. Doctor Rich now

chooses his terms very carefully. He clearly states that the hypersensitive reaction of reinfection can be abolished by desensitization, a statement which will be universally accepted. He further adduces impressive evidence for his conclusion that—under well defined conditions—desensitized animals resist a reinfection more successfully than do hypersensitive controls. In later chapters, arguments are discussed which show that desensitization is not necessarily a desirable condition in man. These chapters will do a lot toward clarifying what must have appeared to many as chaotic controversies.

It should be clear by now that Doctor Rich's book is not just another interesting book on tuberculosis, but that is is so fundamentally important in content and concept that it should be required reading for all workers in tuberculosis who wish to do more than just detect shadows on films , hear râles, inject air or cut ribs. It is exactly in the interest of its widest possible circulation that a closer and more continuous relation to practical problems would have been desirable. It might be difficult to convince the clinician that he really *must* read this book of 1,000 pages if he finds that it contains only three roentgenograms of two patients. But, if the reader is still with me, he should understand that I urge him in his own interest to study this book in spite of the fact that in it the relation between fundamentals and bed-side facts is somewhat more tenuous than it need have been.

T. N. RAFFERTY: *Artificial Pneumothorax in Pulmonary Tuberculosis: Including Its Relationship to the Broader Aspects of Collapse Therapy. With an Introduction by Henry Stuart Willis. Pp. xv + 192, with 26 illustrations, Grune & Stratton, New York, 1944, cloth, $4.00.*

By ELI H. RUBIN

The author states that the ideas around which this book was written were formulated in the course of an association of approximately five years with the staff of the William H. Maybury Sanatorium, Northville, Michigan. To this study, Doctor Rafferty brought a thorough training in surgery. The result is what might be expected: a small volume touching on a few of the high lights of pneumothorax and surgical treatment of a disease which receives scant consideration in its own right. The book includes generous quotations and tabulated material, drawn from selected sources, and a noticeable lack of authoritative, first-hand information of the subject.

In the foreword, it is stated that a discussion of the technical factors involved in the administration of pneumothorax is not included because they are of little importance in securing favorable results. Yet, on page 75, it is stressed that unless one gives constant attention to individual factors as the procedure progresses, and unless pneumothorax is administered or supervised by one thoroughly familiar with the procedure, the treatment becomes a haphazard measure of doubtful value and capable of producing serious complications. The particular

complications are not described. Mention might have been made of the occurrence of air embolism, mediastinal herniation, pleural effusion and a few others. The book also fails to note that pneumothorax patients occasionally get married, have children and are subject to diabetes and other ailments which present problems in management.

In a volume devoted to pneumothorax and surgical treatment, the failure to include discussions on the pathology and pathological physiology of the collapsed lung is inexcusable. The phenomenon of selective pneumothorax is not described. For its size, too much space is taken up with discussion and tabulations of the results of treatment, particularly so since they contain none of the author's. Perfunctory remarks are made on the importance of laboratory findings, and these refer mainly to the unreliability of the sedimentation test. The space might have been devoted to the most important test: the examination for the presence of tubercle bacilli in the sputum and gastric contents, which receives passing notice. On the whole, the book was written by one inexperienced in many phases of pneumothorax treatment. This opinion is confirmed by a reading of three chapters based on the author's own observations and reflections.

The best portions are the ones dealing with tracheobronchial tuberculosis, the tension cavity and closed intrapleural pneumonolysis. They take up a considerable portion of the small volume. In the chapter on tracheobronchial tuberculosis, the author emphasizes the importance of bronchoscopy as an integral part of the collapse therapy program. The symptoms, roentgenological findings, as well as the physiology and pathological physiolgy of bronchial drainage are described concisely, yet thoroughly. The remarks on treatment represent the latest thought on the subject. This is undoubtedly the best chapter of the book and includes pertinent observations on the management of pulmonary tuberculosis complicated by bronchial tuberculosis based on original studies by the author and Shields. The chapters on the tension cavity and closed intrapleural pneumonolysis are also well done.

DAVID O. N. LINDBERG: *A Manual of Pulmonary Tuberculosis and an Atlas of Thoracic Roentgenology. Pp. xv + 233, with 189 illustrations, Charles C Thomas, Springfield, Illinois—Baltimore, Maryland, 1943, cloth, $6.50.*

By H. McLEOD RIGGINS

This Manual and Atlas consists of 233 pages; it is attractively bound, the paper and printing are good, but the X-ray reproductions are only fair to poor.

In the preface the author states that the purpose of the Manual is to cover briefly the practical phases of pulmonary tuberculosis. While he has obviously attempted to do this, many important phases of the disease, its prevention and control, have not adequately been dealt with.

The Manual is divided into two parts: the five chapters of Part I deal with the

diagnosis, treatment and control of tuberculosis; Part II with *Thoracic Roentgenology*, and constitutes the Atlas. Before reviewing the individual chapters, one may say that the subject matter is not only brief but sketchy. Many of the author's statements and conclusions are controversial and are not generally accepted.

It would seem that the author fails to give sufficient consideration to the fundamental aspects of tuberculosis for the Manual to be of great use to the general practitioner, and one can hardly expect it to contribute significantly to the knowledge of the specialist in tuberculosis.

The first chapter in Part I deals with diagnosis and is limited to 7 pages, a large part of one page consists of a chart, and parts of four other pages are taken up with photographs. In the discussion of the diagnosis of pulmonary tuberculosis, too little emphasis is placed on good history taking. Since the majority of cases of tuberculosis are first seen by physicians not specializing in tuberculosis, it is this large and important group of practitioners which needs and should have practical, concise and dependable information which might lead them to *suspect* tuberculosis. The author might have emphasized the fact that, unknown to themselves, thousands of people have significant, dangerous but curable tuberculosis, yet relatively few have symptoms which the patient regards with concern, although they should concern the physician, if he fully appreciates their significance. The author's statement, therefore, that "the diagnosis of pulmonary tuberculosis is readily accomplished in the presence of advanced disease," may mislead the general practitioner and fails to emphasize the necessity of careful inquiry when one confronts patients having *few* symptoms, but often *extensive* disease.

The discussion of the primary lesion on page 9 is largely from the roentgenological point of view and is poorly arranged and vague. A disproportionate amount of the few pages devoted to diagnosis is taken up with the tuberculin test. More space is given to the importance of the tuberculin test than to sputum examination for tubercle bacilli. Also more emphasis might have been given to the culture of sputum for tubercle bacilli. This method of examination is of such accuracy and is so economical that its routine use should be recommended, especially during the war when guinea pigs are relatively scarce.

A partial listing of certain nontuberculous pulmonary and "intrathoracic" conditions hardly adds to the usefulness of the Manual. The space could well have been devoted to tuberculosis. Although the Manual is one of pulmonary tuberculosis, the author touches on differential diagnosis of "intrathoracic states," and "intrathoracic abnormalities" several times, especially on pages 14 and 27. One would wish that the author had approached the important subject of differential diagnosis in a more detailed manner, or else not have attempted to include it at all in a Manual of this type. Many who are daily confronted with the fascinating and involved problems of differential diagnosis of "intrathoracic abnormalities" are a bit taken aback on finding only a few lines devoted to this subject, a sample of which follows: "The roentgenological evidence of other intrathoracic abnormalities closely follow in the shadowgram their naked eye appearances as seen in the pathologic specimens."

In Chapter II, *Roentgenological Technique and Interpretation* are discussed. Since brevity has been mentioned as the keynote of the Manual, it is thought that too much valuable space is given to the consideration of the equipment of the X-ray laboratory, much of which can be found in pamphlets which may be obtained from manufacturers of X-ray equipment.

Some 20 pages, including several charts, graphs and photographs, are devoted to the general management of pulmonary tuberculosis. While the reviewer is inclined to agree in part with the statement that "climate plays a minor rôle (in the treatment of tuberculosis), and—tuberculosis finds favorable treatment in any climate," nevertheless, this statement will probably evoke considerable comment and, well it should perhaps. The final word has been said about very few matters of importance, and least of all regarding such complicated and controversial subjects as the treatment of pulmonary tuberculosis. Different climates appear to be beneficial in certain selected cases of tuberculosis, but it should be added that the reviewer knows of no climate of such therapeutic value as to be a substitute for rest, hygienic and proper medical and surgical treatment. The value of prolonged bed-rest for fresh, active lesions might have been emphasized more.

At a time when occasional thoracic surgeons seem to believe that pulmonary tuberculosis is a surgical disease, it is the duty and responsibility of internists to continue emphasizing the basic fundamentals of treatment of this *constitutional* disease. This the author has attempted to do. It might be noted that lobectomy is merely the removal of a lobe; it does not cure the constitutional disease—tuberculosis.

Exception is taken to the statement on page 35 that "x-ray evidences compatible with those of *healed lesions*" are necessary for "semi-ambulant regime." The reviewer believes that it is generally agreed that semi-ambulant activities may be begun some time prior to the time the disease is apparently arrested, which is long before the lesions are "*healed*." The statement that rehabilitation should not "have a place on the rest program for the patient who is attempting to conserve his energy" is also controversial. One must define what rehabilitation is, and what is "the rest program." Many patients while still on a rest program and in the institution may, with great benefit, begin a rehabilitation program. Education of the patient, particularly concerning his disease and what he can do to regain and retain good health, may be regarded as rehabilitation, and can and should be begun while the patient is still in the institution, "on the rest program." Many other controversial statements and conclusions are made in the chapter, only a few of which may be mentioned. It is difficult to agree with the statement regarding the development of bronchiectasis on pages 41 and 42. It is also difficult to understand how "oxyperitoneum or pneumoperitoneum are useful in tuberculous peritonitis." The author also implies that they may be useful *even* in tuberculosis of the intestines.

Chapter IV, covering 16 pages, is devoted to *Surgical Considerations*. Of the surgical operations performed at the author's institution, it is of interest that 16.6 per cent of 550 cases had *phrenic nerve* operations, 10.4 per cent had thoracoplasty, and 5.8 per cent had intrapleural pneumothorax and 0.9 per cent had

extrapleural or surgical pneumothorax. Many who have observed the functional crippling resulting from *permanent* phrenic paralysis can hardly agree with some of the author's indications for this operation. The reviewer also finds it difficult to agree with the author's indications for pneumoperitoneum following permanent or temporary phrenic paralysis. However, he is in full agreement with the idea that, if pneumothorax cannot be made effective with or without pneumonolysis within a few months or even after shorter periods in certain instances, it should be promptly abandoned.

The discussion of *Tuberculous or Mixed Empyema* lacks lucidity. One is not able to determine if the author is considering pure tuberculous empyema or pyogenic and tuberculous empyema. The two conditions are vastly different as to prognosis and treatment, and the discussion should so indicate. The statement on page 57, that 5 per cent gomenol in mineral oil is a "disinfection oleothorax" for tuberculous empyema, cannot be accepted as a proved scientific fact. It is the reviewer's opinion that oleothorax for tuberculous empyema is generally regarded as practically obsolete and that gomenol apparently has no bactericidal or bacteriostatic effect on the tubercle bacillus. It is the opinion also that extrapleural (surgical) pneumothorax should be used only in very rare instances.

The author recommends pneumonectomy in certain cases of advanced tuberculosis. He fails to mention lobectomy which, in the reviewer's opinion, is more likely to become a more frequently used surgical procedure in the treatment of tuberculosis than is pneumonectomy. It should be emphasized that lobectomy or pneumonectomy are indicated only occasionally or rarely and only in carefully selected cases, and should be done only by surgeons with extensive experience in *intrathoracic* surgical procedures and technique. The dead space left by pneumonectomy should usually be obliterated either by filling with sterile mineral oil or by thoracoplasty, if emphysema resulting in functional crippling of the remaining lung threatens.

The last chapter in Part I consists of 7 pages and deals with the *Control Aspects* of tuberculosis. This subject is of such paramount importance and requires the intelligent interest, coöperation and coördination of so many agencies and groups, both professional and lay, on a local, state and national level, that it is thought it would have been most helpful and timely if the author had given a more detailed and critical analysis not only of his personal experiences in this field, but also of those of others who have made such worth while contributions. It should be recalled that new paths are constantly being forged in the fields of diagnosis and control of tuberculosis. The tremendous impetus resulting from mass X-ray surveys throughout the nation, and the millions of chest X-ray films taken in the examination of civilians for the Armed Forces, should and will have far reaching results in the future prevention and control of tuberculosis. However, this new energy unleashed by recent happenings needs, more than ever, *guidance* and *wisdom*, lest its force be spent on barren rocks and its rebound carry us into the calm bay of postwar complacency. In other words, should millions of preschool children and students of high schools (having a positive tuberculin test) be

X-rayed as the author suggests, despite the fact that he finds only 0.31 per cent of active disease in *high school positive* reactors? Such *total* studies may be theoretically desirable, but are they practicable? Are the positive findings of "active" tuberculosis in these groups of preschool and high school students sufficiently great to warrant the tremendous effort and expense necessary, if these groups are to have routine tuberculin tests and X-ray examinations? And how often are these positive reactors to be re-X-rayed? Should not more discrimination be used in the selection of the most vulnerable groups for X-ray examination, since it is impossible to X-ray all of the positive reactors of all groups? May not the *paucity* of *positive* X-ray findings in preschool and school children dull the now vibrant enthusiasm that is abroad? Should not those groups be picked *first* for study where the *most* significant tuberculosis is to be found? The incidence of tuberculosis in these more *vulnerable* groups should keep this vast new interest and new energy alive and working for the eventual and actual control of tuberculosis.

Part II, an *Atlas of Thoracic Roentgenology:* Almost twice as much space (144 pages) is devoted to the Atlas as is given to Part I. Since the reviewer found Part I to be sketchy, it is thought that some of the space in Part II could well have been devoted to Part I.

Tuberculous and nontuberculous conditions are depicted in the Atlas. In general, the X-ray reproductions are fair to poor. If space permitted, many comments could be offered.

On page 92, figure 18, the author describes a large area in the right mid-third of the lung, "(diameter of 5 cms.)," as an "annular shadow" which "represents recent invasion of the peribronchial structures and by its rapid disappearance on stereoscopic viewing, was found *not to be a cavity*" [italics those of the reviewer]. It is felt that this "annular shadow" very possibly represents a true pulmonary cavity, possibly a tension cavity. It seems a matter of considerable importance and is regrettable that the discredited "annular shadow" theories of the past still confuse present-day thinking. The disturbing fact about "annular shadows" is that they are usually cavities but frequently are not treated as such.

On page 110, the author mentions "spontaneous closure of cavity by formation of *intracavitary* fibrosis" [italics those of the reviewer]. It is presumed that reference is made to fibrosis around the cavity—not *within* the cavity.

"Large congenital cysts of the lung," shown on page 186, may be *acquired* emphysematous bullae or blebs. The reviewer is not convinced that the case of "pulmonary syphilis" shown on pages 208 and 209 is one of proved syphilis of the lung because "the lesions show retrogression following intravenous sodium iodide therapy." Most clinical authorities hesitate to make an antemortem diagnosis of syphilis of the lung, and many pathologists find it difficult or impossible to diagnose syphilis of the lung *at autopsy*.

This Manual on pulmonary tuberculosis and chest film Atlas is timely and of considerable interest. However, it contains many controversial statements and conclusions with which the reviewer finds it difficult to agree.

MERVIN C. MYERSON: *Tubersulosis of the Ear, Nose and Throat: Including the Larynx, the Trachea, and the Bronchi. Pp. ix + 291, with 89 figures, Charles C Thomas, Springfield, Illinois—Baltimore, Maryland, 1944, cloth, $5.50.*

By JOSEPH BERBERICH

Doctor Myerson gives a comprehensive presentation of the knowledge of the tuberculous diseases of the ear, nose, throat, larynx and bronchi with special attention to diagnosis, differential diagnosis, prognosis and therapy. The whole subject is based on many years of thorough study of a large number of cases. Doctor Myerson rightly stresses once more the almost generally accepted opinion that the tuberculous diseases of the upper respiratory tract are a blood-stream infection secondary to a primary focus in the lung. He believes, as others do, that the prognosis of tuberculous disease in the ear, nose and throat depends on the condition of the lung. And this is the reason why a specific disease of the ear, nose and throat should always be treated in collaboration with the internist.

The author suggests a new classification for the lesions of the larynx: the exudative, the productive and the destructive. It seems to me that this new grouping has some advantage for practical and clinical consideration of this difficult problem.

As far as local therapy is concerned, Doctor Myerson relies primarily on electrocautery; he has never seen any really good results from artificial light or X-ray therapy. Lime water inhalations and carbon dioxide snow treatment are not mentioned. He is satisfied with his therapy and many interesting statistics prove his good results. Doctor Myerson is well aware of the fact that his experience differs from that of many other authors.

Doctor Myerson's remarks on direct laryngoscopy are interesting. Direct laryngoscopy is harmful and is contraindicated when an active lesion of the larynx exists. In most cases of laryngeal tuberculosis the laryngeal speculum should not be used.

The author does not claim to have made a basically new contribution in his book, but he describes the pertinent facts, based on his own experience, in remarkably clear and concise terms and critically examines the diagnostic and therapeutic methods. Such an account is particularly valuable for those who lack sufficient experience in this field. All who desire to probe deeper will find an excellent guide in the bibliography.

The chapter on the tracheobronchial tract deserves special mention, because here particularly the author has contributed many new and valuable facts.

The illustrations and arrangement of the book deserve high praise.

LOUIS E. SILTZBACH: *Clinical Evaluation of the Rehabilitation of the Tuberculous. Experience at Altro Work Shops 1915–1939. Report of the Committee for the Care of the Jewish Tuberculous, Inc. Pp. x + 70, with 33 tables, Published by the National Tuberculosis Association, 1790 Broadway, New York 19, N. Y., 1944, paper, fifty cents.*

By MAX PINNER

A preliminary report by Doctor Siltzbach on medical experiences at Altro Work Shops was published in the REVIEW in November, 1942. The present monograph is a much more complete and elaborate study. In the former paper, only survival rates of patients following discharge from Altro and recurrence of tuberculosis were discussed. The complete study presents full statistical data on the medical and social status of patients admitted to Altro and its change during the period 1915 to 1939, on medical observation of patients during their stay at Altro, on survival and morbidity rates following discharge and the principles on which the work shops are operated.

Viewed from any angle, the results in terms of survival and economic rehabilitation are so strikingly better than in any comparable group of discharged patients that the Altro experience has not only justified itself in full measure, but it implies a condemnation of the absence of similar rehabilitation work for the vast majority of suitable discharged patients. It is certainly demonstrated that the wasteful and disheartening cycle of treatment—discharge—exacerbation—readmission can successfully be broken by intelligent handling of discharged patients, that is, by preventing them from returning into the living conditions under which they developed their clinical disease in the first place.

Any attentive reader of Doctor Siltzbach's report will understand that many factors coöperated in the achievement of the gratifying results he reports. It may deserve emphasis that this group of patients was exposed to many more beneficial influences than only that of a period of employment under sheltered conditions, such as Altro provides. Altro is only *one* of the activities of the Committee for the Care of the Jewish Tuberculous, and the patients who go through Altro participate in all the advantages that this Committee provides, too few of which are available to other groups of patients. There is social service work which, for many patients, starts at the time of first diagnosis and which includes his family, which continues throughout his sanatorium stay and for an indefinite period after his discharge; there is the medical follow-up work which the Committee insists upon; there is the careful selection of patients for admission to Altro. Even after such selection is made, a three-month probationary period serves to eliminate ex-patients who for any reason are not suitable for employment at Altro; roughly, 15 per cent of all admitted patients were ruled out during their probationary period. The remaining 964 patients, representing a highly selected group, form the basis of the report.

It is not suggested that the strict selection of ex-patients for Altro is the sole reason for their excellent performance; internal and comparative evidence indicates that the "reconditioning" period at Altro is of prime importance. But, without a wise selection of candidates for rehabilitation, failure must be expected. It is precisely in regard to such selection that Doctor Siltzbach's study adds significant information. It is clearly shown that ultimate prognosis is more closely correlated with arrest of the disease and sputum status than with the

anatomical extent of the lesions. It all comes down to a statement that must seem trite in its simplicity: the prognosis of pulmonary tuberculosis is the better, the more completely it is healed. The criteria for "healing" are those used in the National Tuberculosis Association Diagnostic Standards, that is, the bacteriological requirements for "apparently arrested" and "arrested" are satisfied if sputa are negative by smear and concentration for specified periods. This, according to our Sanatorium experience, means that, in from 25 to 50 per cent of the patients listed as sputum-negative on admission to Altro, tubercle bacilli could presumably be demonstrated by cultures of sputum and gastric contents. This, in turn, would indicate—again on the basis of observations on our Sanatorium patients—that recurrences of tuberculosis could be reduced to one-half or one-third, if only patients with negative cultures were admitted to Altro. As long as rehabilitation projects are available for only a small fraction of all discharged patients, this is probably the policy by which the existing facilities could be utilized to the greatest advantage. But the narrower the admission indications for rehabilitation work shops are made, the more obvious and urgent becomes the need for additional facilities of variegated nature for discharged patients, ranging all the way from homes for custodial care for incurable and incapacitated patients who are not in need of hospitalization, to rest-homes for the good (and not so good) chronics, to physical reconditioning schemes as way-stations between sanatorium and sheltered work shops and, finally, to genuine rehabilitation centres which—it is hoped—will, in the future, be broader in scope, so that future patients will be given more varied vocational education than Altro now provides. The experience of Altro, as analyzed by Doctor Siltzbach, will unquestionably provide stimulus and guidance. It will teach, too, that no *one* sheltered work shop can fully solve the rehabilitation problem of even the limited number of patients which it can accommodate. This is suggested by the fact that only 60 per cent of former garment workers returned to this type of work following discharge from Altro, and that only 14 per cent of persons chose the garment industry as their new occupation. Surely, the ideal aim is to prepare the discharged patient for his new work (if new it must be) while he has the physical advantages of sheltered employment. In this connection, one might wish that the title of Doctor Siltzbach's study had been more accurate and more specific; it is too broad, too inclusive. There should have been expressed a clearer realization—in the title—that this report is not generally concerned with the "Rehabilitation of the Tuberculous," but with *one phase* of rehabilitation work as solved specifically by one particular method.

The single aim of Altro has made possible what only the utopian thought possible thirty years ago. The saving in human life and the prevention of suffering and economic despair that Altro has achieved are great; but greater still is the influence it is exerting in expanding rehabilitation services. Doctor Siltzbach has presented the essentials of the first twenty-five years of the Altro story in a lucid and intelligent manner. The statistical data are clear and their significance is objectively discussed. The results of the work at Altro may well become a measuring rod by which the success of other rehabilitation schemes will be evaluated. In the present stage of the problem of rehabilitating tuberculous patients, when many plans are enthusiastically discussed and action is frequently hampered

by inertia, traditional resistance to newer developments and by sheer ignorance, Doctor Siltzbach's monograph provides self-explanatory facts which will be a sounder basis for discussion than many cherished opinions and ideas.

HOLLAND HUDSON AND MARJORIE FISH: *Occupational Therapy in the Treatment of the Tuberculous Patient. Pp. xii + 317, National Tuberculosis Association, New York, N. Y., 1944, cloth, $3.00.*

By LOUIS E. SILTZBACH

The amused tolerance with which tuberculosis hospital administrators and clinicians have regarded the efforts of their occupational therapy departments is becoming a thing of the past. Occupational therapy has come of age and today the demand for trained personnel in this field far exceeds the available supply. This volume is primarily a text and reference work for undergraduate students of occupational therapy planning to work with the tuberculous. However, interest in the book will not be limited to such students, since it contains much that is of importance to tuberculosis clinicians, administrators, nurses, social workers and rehabilitation agents. An eminently practical work, it is clearly and engagingly written and the arguments it sets forth are closely reasoned. These are qualities which one would anticipate from two of the foremost authorities in this field.

Reasons for the increasing importance of occupational therapy in the modern sanatorium set-up are implicit in this book. The trained therapist is a morale builder. With a wide variety of projects, intelligently applied and properly integrated with the patient's medical regimen, she can do much to assuage fears, banish worries and help the patient develop a rational attitude toward his illness while he is under treatment. Moreover, she can often render effective aid in forestalling a patient's departure from the institution without medical sanction. Her rôle becomes particularly important at the time when the patient is introduced into ambulant activity. As the authors state: "Medically, then, the occupational therapist may become more than ever valuable to physician and patient by making certain that prescribed work-up activity is carried out daily and that it is not exceeded qualitatively or quantitatively. The results of such an apparently simple service are that the physician has an opportunity to test the apparent stability of the patient's lesions; the patient further establishes the regular habits which are essential to his safety, and develops a self-confidence which helps him to adjust successfully to the world outside the hospital."

The authors stress the need that the occupational therapist be an informed and tactful person. She must know something about tuberculosis, its cause, its manner of spread, its treatment and the precautions that must be taken to keep the patient from suffering a recurrence of his disease after discharge from the sanatorium. Most of this she must learn from her medical colleagues on the

job during conferences but the authors' simple and clear exposition of the fundamental facts in this field will serve the uninitiated as an excellent introduction.

Since the educational lacks of the patient population often handicap proper adjustment and job placement after discharge, teaching techniques and pedagogical principles of adult education are fully presented. Other chapters deal with typical craft and workshop projects which have been found applicable to the tuberculous. Basic aims of these projects are set forth significantly as follows: "The purpose of an occupational therapy shop in a tuberculosis hospital should not be trade training, but the conditioning of patients, physically and emotionally, for what is to follow discharge. The physician needs a proving-ground before a prognosis based upon X-ray evidence can become more than theoretical. The patient needs opportunity to test his own physical capacities."

Thus, at discharge, although the patient has not learned a trade, he has been conditioned for trade training both regarding work-tolerance and orientation to the use of tools and machinery. Thereafter, whether he undertakes rehabilitation through vocational training or works at a sheltered workshop or enters industry directly, his task of adjustment will have been facilitated by this in-sanatorium preparation.

Many institutions of higher learning are incorporating special courses in the field of tuberculosis in their occupational therapy curricula. This book will become the *vade mecum* of students taking such courses. The medical reader will learn much about what makes the occupational therapist tick but he will also get a pretty stimulating picture of himself and the way the informed nonmedical worker sees him in relation to his function. This book should be very useful in increasing the effective coördination of occupational therapy with the other arms of treatment of pulmonary tuberculosis.

ARNOLD SHAMASKIN: *Waging War against Tuberculosis. Prepared for distribution to tuberculous patients hospitalized in Veterans Administration Facilities. Pp. 17, paper.*

By KENDALL EMERSON

From recent reviews it is evident that the results attained in the treatment of tuberculous veterans of the first World War have not been wholly satisfactory. There are many plausible reasons for this situation. Among them is noncoöperation on the part of the patients themselves. This is often due to lack of knowledge of the basic factors in treatment which lead most surely to arrest of the disease.

The author of the booklet *Waging War against Tuberculosis* has been an officer in the tuberculosis service of the Veterans Bureau for many years since the first World War. He has developed a short manual of health instruction for tuberculous veterans which is based on these many years of experience and on a keen knowledge of the mental attitudes encountered among these patients. He makes no reference to certain well intentioned but unwise legislation which has been a

handicap in rendering successful and satisfactory treatment. Instead, he explains in a direct, simple and common sense manner that defeat of the tubercle bacillus can only result from "military alliance" between the patient and his physician.

This theme is carried through the text of the booklet in a persuasive manner and the various aspects of tuberculosis—its cause, prevention and treatment—are discussed in simple and direct language, which invites the patient's application to himself of the facts as they are presented.

More abstruse problems connected with epidemiology, methods of infection, allergy and immunity are skirted without introducing complicated or controversial matters. Rest, chemotherapy, surgical treatment, the importance of fresh air and judicious comments on climate all receive attention. Certain special questions that commonly arise are answered.

While the booklet is of convenient size, its style is somewhat austere and the type rather small. It deserves a more attractive format and it is hoped that, when the new edition appears, this may be taken into consideration. The fact that already a large first edition has been exhausted, and the reception which the booklet has received at the veterans hospitals, both from the medical staff and patients, give ample evidence of the need for such informative material. It is expected that further effective educational measures may be developed to carry still further the work of this very excellent miniature teaching manual.

WALTER BERBLINGER: *Der Schwund tuberkulöser Lungenkavernen. Pp. 130, with 61 illustrations, Basel, Benno Schwabe & Co.—Verlag, 1943, paper, Fr. 15.*

By MAX PINNER

There is much discussion and disagreement about the pathophysiological mechanism and the morphological processes leading to cavity healing. That cavities of all morphological types and of various sizes heal with and without collapse measures, and that this process is not rare, is no longer in doubt. But anatomical studies on healing and healed cavities are rare for obvious reasons, and this fact in part explains that the underlying mechanism is still *sub judice*. In a recent publication, Pagel and Simmonds have collected all available observations and stated that 33 "healed" cavities are on record; but probably not more than half of these can be considered as anatomically healed. Another reason for the lack of agreement is the fact that different authors use different criteria for "healing" and "healed," even in regard to anatomically studied material. Finally, clinical and roentgenological observations seem to justify the assumption of a healed cavity in cases where the anatomical substratum, if available, clearly shows that active tuberculous processes are present and that the tissue defect has not been replaced by scar tissue.

Pathological studies on 10 pertinent cases, reported by so careful and experienced an observer as Doctor Berblinger, are, therefore, a most welcome addition

to the scanty material at hand. He presents 10 cases or 11 cavities in various stages of healing, 2 of which are completely healed and 5 of which are nearly, but not completely healed.

Doctor Berblinger wishes to answer mainly three specific questions in the complex problem of cavity healing: (*1*) Is the process of healing the same in so-called elastic and in rigid cavities? (*2*) Is the occlusion of the draining bronchus or bronchi a constant and necessary forerunner of cavity healing? (*3*) Is the result of cavity healing, the cavity scar, morphologically sufficiently characteristic to permit its recognition and definite diagnosis, even if records of a previous cavity are not available?

Briefly, Doctor Berblinger's answer to all three questions is yes.

The processes by which the final answers are reached are elaborate, not always convincing and, at times, confusing. In part, this is caused by a number of insufficiently defined terms. According to H. Alexander, rigid and elastic cavities are differentiated without giving a description of the two types. One gathers that some of the elastic cavities, but probably not all of them, are those that are known in the American literature as "positive pressure cavities," as "ballooning cavities" or, according to Eloesser's recent suggestion, as "insufflation cavities." Rigid cavities are those with thick fibrous walls. But it is repeatedly admitted that the differentiation between the two types is not always possible. Then, there are the terms referring to cavity healing: (*1*) annihilation of cavity (*Kavernenwernichtung*) is the "complete disappearance of the cavum caused by tissue destruction" (*Zerfallshöhle*); (*2*) cavity healing (*Kavernenheilung*)—a more precise translation would probably be "healed cavity"—is said to exist "when cavity symptoms are continuously absent, when neither elastic fibres nor tubercle bacilli are present in the sputum for at least two years;" (*3*) disappearance of cavity (*Kavernenschwund*) may be assumed when serial X-ray films show the transformation of an annular shadow into a diffuse shadow and then into a central density (*Fleckschatten*); clinically this is expressed as cavity healing. However, it is stated that the clinician is justified to speak of cavity healing when the morbid symptoms caused by a cavity have been absent for a long time, "even if a residual cavity is still demonstrable." On the other side, Doctor Berblinger says that "healing in the true sense is complete cavity disappearance with the formation of a scar at the site of the cavity and the cavity bronchus."

One cannot fairly evaluate this monograph without pointing out these terminological complications and implications. It is of equal importance to be aware of the fact that throughout this book, but particularly in the discussion of the literature and the final comments of the observed cases, there is much speculation beyond actual findings, much theorizing around morphological observations and around putative and postulated potentialities, some of which have admittedly never been observed. It is characteristic for this study that, in the rather brief and incomplete discussion of the literature, more weight and space are given to other authors' opinions and theories than to their factual observations.

The solid and most interesting nucleus consists of the case reports, mentioned

before, which occupy about 75 pages and are illustrated by 61 figures, most of which provide excellent documentation for the author's discussion. These illustrations are beautifully reproduced and give testimony to a high type of workmanship, the equal of which is all too rarely in evidence in medical publications on this side of the Atlantic.

Doctor Berblinger's main conclusions have already been stated. While it is unlikely that they will be acceptable to all or that they are the definitive answers to the problems they seek to solve, the detailed histological studies on which they are based demand the serious attention of anyone who will in the future study and discuss cavity healing, particularly in its histopathological aspects.

Radiation and Climatic Therapy of Chronic Pulmonary Diseases. With Special Reference to Natural and Artificial Heliotherapy, X-ray Therapy, and Climatic Therapy of Chronic Pulmonary Diseases and All Forms of Tuberculosis. Edited by Edgar Mayer, with the collaboration of 22 contributors. Pp. xiii + 393, with 46 illustrations, The Williams & Wilkins Company, Baltimore, 1944, cloth, $5.00.

By MAX PINNER

The rôle of climatotherapy and of the various types of radiation in the treatment of tuberculosis and nontuberculous chronic pulmonary diseases is still much under discussion. The present volume, written by 23 contributors, makes the existing diversity of opinions quite obvious and adds little factual material that might help to clarify the issues. The various contributions are extremely uneven in value, information and objectivity. Doctor Coblentz has written a clear but all too brief chapter on the *Physics of Light Radiation*. This chapter along with those by Doctor Laurens on *Physiologic Action of Light* and by Doctors Krusen and Elkins on *Sources of Light; Modes of General and Local Application* (totalling some 30 pages) contain the bulk of the factual substance of all that is said of light and climatic therapy in a total of about 250 pages. While in the first three chapters the quantitative aspects of radiation from various sources are stressed, the later clinical chapters hardly mention measurements in therapy beyond the customary—and meaningless—warning against "too much." This fact is characteristic of the vague—if not evasive—type of information on clinical application and therapeutic results. Reports on the effect of solar radiation (and artificial sunlight) and climatotherapy are presented in uninformative generalizations, such as "favorable results;" "appears to have a stimulating effect;" "we finally concluded that artificial light exposures occassionally changed the outcome of these patients;" "a helpful adjuvant to rest"—etc. Only in a few of the 13 chapters on radiation and climatotherapy is an attempt made to present statistics on therapeutic effects; most of them are incomplete and unconvincing, mainly because comparable control series are rarely cited. As one example, the proof for the therapeutic advantage of a given climate begins with the statement: "However, carefully controlled statistical studies by out-

standing and reliable tuberculosis authorities have proved beyond the shadow of a doubt that there is a great advantage to the tuberculous patient residing in a favorable climate." The "proof" rests largely on the low mortality rate in that particular region which has obviously no necessary relation to the therapeutic effect of the climate that was to be proved. Another step in this "proof" is the survival time of sanatorium patients with open tuberculosis. This is reported to have been more than three years in 19 per cent and more than five years in 12 per cent. It is obviously impossible to decide whether or not these are favorable figures. (From the Dutch Sanatorium Berg en Bosch it was reported that of all sputum positive patients 17 to 32 per cent had died two years, 31 to 45 per cent four years and 43 to 52 per cent six years after discharge.)

Climatotherapy is repeatedly linked with the name of Hippocrates in order to stress the dignified age of this form of treatment. But neither age nor tradition have established clear-cut indications, agreement as to its importance, or clinical effectiveness. The situation is further complicated in this book by the fact that representatives of various climates quite naturally praise their particular meteorological environments. The Colorado advantages are recommended by the cryptic statement that "Quantitative rest may be had anywhere, but the qualitative variety is best obtained in high, dry, sunshiny mountains as in the Rockies." The advantages of the Adirondack region are presented in cool (very cool, at times!) meteorological data (and a few picture post-card views). One may wonder whether the old, and here repeated statement that one Adirondack winter does as much for the cure of the patient as two summers, is not simply explained by the fact that the winter there is about twice as long as the summer. It is disappointing that the most essential information as to the clinical effect of the Adirondack climate (in which tuberculosis has been treated for some sixty years) is contained in the following sentences: "During cold weather the patients are not only at rest but are relatively immobilized because in cold weather one does not want to move much for fear of disturbing the blanket covering. That this exposure to a free play of air is beneficial is easily determined by observing the improved condition of a patient who had previously been in bed in a room with a window or two open." No attempt is made to present figures or any plausible physiological concept that might explain the vaunted effects of that particular climate.

Dr. Clarence A. Mills has written a chapter on *Climatic and Weather Effects with Special Reference to Respiratory Diseases* which is profoundly interesting and informative. In this chapter, as well as in the Appendix to it in which Dr. William F. Petersen's studies on weather and disease are briefly reviewed, the fundamental approaches to climatotherapy are indicated. But these basic studies have not discernibly influenced the other chapters in this section.

In 7 brief chapters X-ray therapy of tuberculosis and other chronic pulmonary diseases is discussed. These chapters are of an entirely different calibre than the preceding ones. They are concise and present precise information on technique and dosage of treatment, on indications and contraindications, and on results obtained.

The next section consists of two factual and worth while chapters in which surgical therapy is compared to conservative treatment of bone and joint tuberculosis. Here, the reader will find substantial information as to the relative limitations of these two modes of management.

In a final chapter, Dr. Edgar Mayer, the editor of this volume, is faced with the difficult task to present a *résumé*. It is this reviewer's impression that Doctor Mayer wisely recognized the impossibility of summarizing the many contradictory and vague opinions presented in this book and that he has, therefore, chosen to give a brief account of radiation and climatotherapy which is essentially based on his previous literary work and his own clinical observations. His recommendations are so carefully worded that most workers are likely to agree with him, although dissension may be expected from some of his own contributors who have presented considerably wider indications with considerably more enthusiasm.

Medical Radiographic Technic. Prepared by the Technical Service Department of General Electric X-ray Corporation, under the editorial supervision of Glenn W. Files, Director, in association with 17 contributors. Pp. 365, with 381 figures, Charles C Thomas, Publisher, Springfield, Illinois—Baltimore, Maryland, 1943, fabrikoid, $6.00.

By ROSS GOLDEN

This book was prepared by the technical service of the General Electric X-ray Corporation with the aid of seventeen collaborators, under the supervision of Glenn W. Files. All of the collaborators are X-ray technicians. The first four chapters deal with the fundamental electrical and physical principles involved in the structure of X-ray generating apparatus. The next three are concerned with the calibration of equipment and the factors which affect the quality of the finished film. In these chapters are many mathematical formulae which are very impressive but which will not be understood by the vast majority of radiologists and technicians who will consult this book, among them this reviewer. The eighth chapter is a good discussion of the design of a developing room.

The chapter on anatomy presents a brief description of the bones followed by excellent half-tone drawings of the various portions of the skeleton. Only four drawings are used for the thoracic and abdominal viscera. These could be more complete. In the sagittal section shown in figure 238, the uterus, pancreas and the stomach are shown but are not labeled. The positions of the gallbladder and of the adrenal glands are not shown.

The chapter on positioning is illustrated with good photographs of a model patient in the correct positions, with reproductions of the films so obtained. By means of a mirror at an angle, a right-angle view of the part properly placed is shown. The description of the technique used for each exposure is brief and to the point. It includes the maximum and minimum kilovoltage which may be

required for the greatest variations in thickness. It is surprising that the writers do not advise the erect position in the technique for the nasal accessory sinuses. Only in this way can fluid levels be shown. The accuracy of the examination of the maxillary sinuses in particular is definitely increased if the films are taken in the erect position with horizontal rays. The writers advise the use of larger amounts of barium sulphate for the examination of the stomach of larger, thicker patients than with smaller, thinner ones, whereas the controlling factor is the size of the stomach itself.

Other chapters deal effectively with special topics such as planigraphy, stereoscopy, soft tissues, dental technique and photoroentgenography.

The book is well done, as is usual with the things put out by Thomas. These minor criticisms do not impair its essential value. It will be helpful in the instruction of student technicians and will be useful for experienced technicians who may be called upon to carry out certain technical procedures infrequently.

LEOPOLD LICHTWITZ: *Pathology and Therapy of Rheumatic Fever. With Foreword by William J. Maloney. Edited by Major William Chester, M.C. Pp. xvii + 211, with 69 illustrations, New York, Grune & Stratton, Inc., 1944, fabrikoid, $4.75.*

By LOUIS LEITER

"Rheumatic fever is a noninfectious disease." These are the fighting words with which the late Doctor Lichtwitz begins his small but attractive volume on a disease of perennial interest. Numerous reviewers and other critics, open- or shut-minded, will react according to their own intellectual "microclimates" to the opening sentence and the rest that follows in this frankly challenging monograph. But only those who have been in close association with the author, those who believe that irritation is not too high a price for stimulation, and those who are inclined to set greater value on a majestic, universal viewpoint than on a mass of relatively unorganized facts of clinical experience will reap a satisfying harvest from the pages of this book. Therefore, to the sympathetic reader, it will not matter greatly that the emphasis in regard to the aetiology of rheumatic fever is on the individual patient's allergic reaction to the protein antigen of microbial or other origin, instead of on the haemolytic streptococcus. Unless military censorship conceals the final evidence for the cause of rheumatic fever, one man's theory is still as good as another's. Doctor Lichtwitz is undoubtedly carried away by the flood of his imagery concerning mesenchymal reaction to sensitization; but, at least, he has imagination and in his contribution to the pathology of rheumatic fever is not circumscribed by the Aschoff body. Since he had an excellent sense of humor, much of his apparently dogmatic presentation must have included a tongue-in-the-cheek aspect.

The chapter headings follow the conventional pattern including the definition, aetiological factors, general pathology, system and organ pathology, clinical manifestations, differential diagnosis, prognosis and treatment. Throughout,

correlation of diseases rather than dissociation of syndromes is the author's policy. This leads, at times, to such dubious medical bed-fellows as fibrositis, dermatomyositis and rheumatic fever. Much of the discussion on nonrheumatic arthritis is simply a vehicle for the author's views on the influence of the vegetative nervous system. The recent American literature on chronic arthritis is practically ignored. The coincidental association of two or more diseases, instead of their inherent relationship, is rarely considered by the author. The first mention of the haemolytic streptococcus occurs in the chapter on treatment. While this chapter is full of clinical wisdom, it belongs more in a book on chronic rheumatoid or degenerative arthritis than in one on rheumatic fever. Therapeutic enthusiasts will find little comfort in this chapter.

The foreword by Doctor Maloney is a fascinating historical introduction to the subject of "rheumatism" as well as an excellent summary of Doctor Lichtwitz's thesis.

LOUIS H. SIGLER: *The Electrocardiogram. Its Interpretation and Clinical Application. Pp. xvi + 403, with 203 illustrations and plates, Grune & Stratton, New York, 1944, cloth, $7.50.*

By SIDNEY P. SCHWARTZ

This book aims at a practical application of the electrocardiogram to clinical cardiology. After a few introductory chapters on the foundations of the electrocardiogram and the methods of recording both the standard and the newer accepted precordial leads, there is an excellent simple and concise discussion of the various abnormal rhythms of the heart. Each of the irregularities is presented separately and is amply illustrated with clear-cut and well labeled original electrocardiograms. In many instances there are diagrams to help the uninitiated in interpreting the advanced abnormal cardiac mechanism and in understanding the theories explaining their development.

For practical purposes, too much stress has been placed on the recognition of the various forms of bundle branch block. Exact pathological proof of the correlations between the various forms of bundle branch block and the underlying diseased processes which they are supposed to represent is still wanting. For these reasons it would have simplified matters to have included all of such marked aberrations of the QRS complexes under one name, that is, intraventricular conduction disturbances.

The latter part of the book starts properly with an anatomical description of the coronary circulation and the blood supply to the heart and describes some of the physiological disturbances that may affect the coronary blood flow under normal and pathological states. Unfortunately the electrocardiographic patterns of myocardial infarctions due to actual destruction of structure as a result of coronary occlusion are described under the title of coronary insufficiency, which is a functional disturbance. Since the electrocardiogram aims at correlating the

clinical and graphic manifestations of the underlying disease processes with the pathological changes found at necropsy, it is utterly confusing to talk of insufficiency of the coronary circulation when what is really meant and presented is actually occlusion of one of the coronary arteries. Very recently it has been pointed out that necropsies in patients who have died with myocardial infarctions have revealed the electrocardiographic patterns to have been due to a closure of one of the coronary arteries in over 95 per cent of the cases. For such reasons it may be best to reserve the term of coronary insufficiency for such conditions as *angina pectoris* and for the records obtained during one of its seizures, and keep separate the concept of myocardial infarction as due to closure of one of the coronary vessels.

The chapter on ventricular preponderance as a separate entity presents the more recent views of ventricular hypertrophy and ventricular strain. Unfortunately, however, too few observations have been made as yet to enable us to state with certainty when necropsy findings will reveal a normal sized heart in the presence of an axis deviation with or without changes in the T waves or when the heart will be enlarged or merely dilated.

There are also chapters on the electrocardiogram in myocarditis, diphtheria, hyperthyroid conditions and hypothyroidism and adequate stress is placed on the nonspecific types of records obtained in such diseases as typhoid fever, trichinosis and diabetes. This last part of the book suffers by comparison with earlier portions, in content as well as in illustrations. Nevertheless, this monograph, printed on smooth paper in good type, is a welcome addition to the growing literature on electrocardiography. It may be used with profit both by the general practitioner and specialist alike.

BRET RATNER: *Allergy, Anaphylaxis and Immunotherapy. Basic Principles and Practice. Pp. xi + 834, with 88 figures and 56 tables, Baltimore, The Williams & Wilkins Company, 1943, cloth, $8.50.*

By DAVID E. SILBERMAN

Little purpose would be served by a detailed recitation of the material presented in this work. It may suffice to indicate its scope by quoting its subtitle, which defines the book as "a treatise presenting the fundamental principles and practice governing the use of antisera, vaccines, toxoids, blood transfusions, blood substitutes and sulfonamides, in the prevention and treatment of infectious diseases and the allergic phenomena resulting from their use."

The planning of the book and the method of presentation of the subject reflect the background of the author, who, as a pediatrician and experimental immunologist, has during the past twenty years significantly contributed to our understanding of the basic mechanisms underlying the allergic state.

The unfolding of our knowledge of the pathogenesis of sensitization in man is based in great measure on observations in the experimental animal. Histori-

cally, this understanding developed through a happy, if fortuitous, interlacing of the clinical application of serum therapy, beginning with the observations of von Behring, Pirquet and Schick, with studies arising from the necessity of resorting to the lower animal in the testing and titration of sera in clinical use. It was with this orientation that Doctor Ratner was enabled to transmit more successfully a basic understanding of the subject of allergy in this book, than in any other work presented to date.

His exposition on serum sensitization is comprehensive, and, in the reviewer's opinion, is excellent. Other sections worthy of special mention are the author's presentation of the arteriolar spasm theory of wheal formation; the discussion of drug allergy, amply developed by a review of the literature dealing with the sulfonamides; the relation of the delayed local reaction of the horse serum test to the tuberculin test and to the rôle allergy plays in the course of bacterial diseases; the allergic manifestations encountered in the central nervous system and their peripheral pathways; a most illuminating portrayal of the physiological variations in the leucocyte count, especially in response to sensitization phenomena; and the chemistry and physiological pathology of shock. The section on immunotherapy is so arranged that the busy practitioner can find the practical data relating to the prophylaxis and treatment of infectious diseases with a minimum of effort. A unique feature is the complete presentation of the causes of transfusion reactions, including a lucid explanation of the Rh factor and the rôle that allergy may play.

The literature is handled critically and, where fundamentals are at stake, the author evaluates the original data with care and circumspection. There are about 2,200 references. There are, of course, questions of a controversial nature on which the reader may take issue, but certainly there is a profusion of data, both pro and con, to serve as a basis for an intelligent evaluation of the yet unsettled problems in allergy.

The practicing physician must bear in mind that, although it appears at this time that allergy to sera is assuming a position of lesser importance, the drugs which are being employed instead have already been shown to act as potent sensitizing agents. The basic mechanisms remain the same. The organism reacts profoundly to the invasion by foreign materials, and the manifestations are so protean that Doctor Ratner's contribution must appeal to the general practitioner and specialists in every category of clinical practice.

Books Received

Oscar P. Aguilar and Gregorio Sirlin: La constitucion individual en la tuberculosis. Pp. 123, Libreria "El Ateneo," Buenos Aires, 1944, paper.

Clovis Corréa da Costa: Puericultura e Maternidade. Pp. 230, Imprensa Nacional, Rio de Janeiro, 1943, paper.

RUTH B. FREEMAN: Techniques of Supervision in Public Health Nursing. Pp. vi + 411, W. B. Saunders Company, Philadelphia and London, 1944, cloth, $2.75.

M. GRAY MACDONALD: Handbook of Nursing in Industry. Pp. ix + 226, W. B. Saunders Company, Philadelphia and London, 1944, cloth, $2.50.

STAFFORD L. OSBORNE AND HAROLD J. HOLMQUEST: Technic of Electrotherapy. And Its Physical and Physiological Basis. Pp. xix + 780, with 240 figures and 72 tables, Charles C Thomas, Springfield, Illinois—Baltimore, Maryland, 1944, cloth, $7.50.

MARY SWARTZ ROSE: Foundations of Nutrition. 4th ed. Revised by Grace MacLeod and Clara Mae Taylor. Pp. xi + 594, with 123 figures and many tables, The Macmillan Company, New York, 1944, cloth, $3.75.

GUSTAV SEIFFERT: Virus Diseases in Man, Animal and Plant. Pp. ix + 332, Philosophical Library, New York, 1944, cloth, $5.00.

LUIZ TORRES BARBOSA: Aspectos médico-sociais da mortalidade infantil no Brasil. Pp. 49, Imprensa Nacional, Rio de Janeiro, 1943, paper.

Anuario de Epidemiologia y Estadistica Vital, Ano 1942. Pp. xvii + 425, with many tables and charts, Ministerio de Sanidad y Asistencia Social, Caracas, Venezuela, 1943, paper.

A National Health Service. Presented by the Minister of Health and the Secretary of State for Scotland to Parliament by Command of His Majesty, February, 1944. Pp. 85, American Edition reproduced photographically from the English Edition and published by arrangement with His Majesty's Stationery Office, The Macmillan Company, New York, 1944, paper, seventy-five cents.

A Provisional Classification of Diseases and Injuries for Use in Compiling Morbidity Statistics. The Committee on Hospital Morbidity Statistics, Medical Research Council Special Report Series No. 248. Pp. 168, London: His Majesty's Stationery Office, 1944, cardboard, 3*s*. 0*d*.

AMERICAN TRUDEAU SOCIETY

Report of the Committee on Standard Laboratory Procedure

Dr. Henry Stuart Willis, *Chairman*
Dr. David Crombie — Dr. William Steenken
Dr. Edgar M. Medlar — Dr. C. Eugene Woodruff

REPORTING SPUTUM EXAMINATIONS

In many laboratories, the results of sputum examinations are reported as merely *positive* or *negative* as was suggested in the 1942 report of this Committee. On the other hand, some laboratories still make use of the Gaffky scale for sputum reports. The present Committee condemns this scale as being unduly cumbersome and so detailed as to be misleading.

The clinician will obtain information of value from a report which indicates the type of examination. Accordingly the following form is suggested, the words *positive* or *negative* to be written in the column headed "Results."

SPUTUM REPORT

SPECIMEN	RESULTS
1. Direct smear (single specimen)	.....
1. Direct smear (24 hr. specimen)	.....
2. Concentrate (24 hr. specimen)*	.....
3. Culture (24 hr. specimen)*	.....
4. Guinea pig inoculation (24 hr. specimen)*	.....

* If several days' collection of sputum is concentrated this should be specified.

If fewer than three bacilli are found in the examination, the sputum should be reëxamined using one of the more delicate tests for tubercle bacilli.

The fact that tubercle bacilli are *present* in the sputum is of more significance than their number, since minor variations in number may be caused by factors entirely unrelated to the status of the patient, such as manner of collecting the sputum and technique employed in making the smear. However, gross variations in the number of bacilli may be of clinical significance. For those who prefer that the report give a rough indication of the number of bacilli being excreted, it is suggested that the terms *numerous*, *few* or *rare* be used instead of the word positive in describing the smear. These terms are defined arbitrarily as follows:

Numerous: 10 or more acid-fast bacilli in every oil immersion field
Few: from 1 to 9 acid-fast bacilli found in most oil immersion fields
Rare: single acid-fast bacillus found in occasional oil immersion field

GASTRIC LAVAGE

In many cases tubercle bacilli can be demonstrated in the gastric contents of a patient whose sputum is consistently negative. Thus the recovery of

tubercle bacilli by gastric lavage may be considered the most sensitive method yet devised for laboratory diagnosis of tuberculosis. The technique employed in making this test has previously been described (1).

In case gastric material is submitted for examination, the report form suggested for sputum may be used with the word sputum replaced by the words gastric lavage. The direct smear stage would be unused in that case.

It should be emphasized that nonpathogenic acid-fast bacilli are more likely to be found in the gastric contents than in the sputum. For this reason, one should not depend upon a gastric smear but should use culture or guinea pig inoculation for identifying tubercle bacilli.

NEED OF EXTENDING PUBLIC LABORATORY SERVICES

It is the custom in many municipal and state department of health laboratories to examine sputum specimens by direct smear only. The consensus of the Committee is that such laboratories should be prepared also to make concentrate examinations and cultures of specimens, for those sanatoria and individual physicians unable to provide such service for themselves. Recognizing that labor problems make such an addition to the service difficult to accomplish at the present time, we believe, nevertheless, that a culture service on sputum specimens should be held as a postwar ideal toward which all laboratories should strive.

RED CELL SEDIMENTATION TEST

Although the factors responsible for causing an increased sedimentation rate of erythrocytes have not been demonstrated, this lack of knowledge has not prevented the use of the phenomenon in the study of disease processes. The Westergren and the Linzenmeyer methods of performing the sedimentation test have been described in a former report of this Committee (1). At present the Westergren technique is preferred because of the relative ease with which the apparatus is cleaned and because the sedimentation is easier to read in the long Westergren tubes than in shorter tubes of greater diameter.

Sufficient data regarding the sedimentation test are now available to warrant the following categorical statements:

(*1*) An increased sedimentation rate of erythrocytes is present in both infectious and noninfectious disease processes; it is not specific.

(*2*) Serial tests are necessary; the persistence of the rate, within normal or abnormal limits, is of greater significance than are fluctuations between normal and abnormal values from time to time.

(*3*) The degree of deviation from normal does not always indicate the severity of the condition; that is, the rapid accumulation of a bland and rather transitory pleural effusion in a case of artificial pneumothorax may cause as great a change in the sedimentation rate as a serious bronchogenic spread of tuberculosis.

(*4*) In tuberculosis the degree of sedimentation does not indicate the extent of the disease. A normal rate does not exclude active tuberculosis.

(*5*) A high sedimentation rate at the end of one hour, whether the fall be rapid or slow, is an unfavorable omen in tuberculosis if it persists in serial tests; a too

fine grading from normal to the extremes of abnormality is not warranted at the moment.

(*6*) A single reading at the end of one hour yields sufficient information for practical clinical interpretation and requires the minimum of the technician's time.

FLUORESCENCE MICROSCOPY OF MYCOBACTERIUM TUBERCULOSIS

Since the Ziehl-Neelsen method has stood the test of constant usage for more than half a century, any new method for staining and demonstrating tubercle bacilli should be subjected to the severest tests before being accepted as a preferred laboratory procedure. This is currently true with regard to the technique employing fluorescence microscopy. Early reports concerning this technique were highly favorable, some observers even going so far as to claim that fluorescence microscopy is almost equal to cultures for identifying tubercle bacilli. More recent reports, however, are not enthusiastic regarding the adoption of fluorescence microscopy in preference to the Ziehl-Neelsen method, until further work has been done to prove that it is superior. Among these latter reports should be mentioned those of Freiman and Mokotoff (2), Lee (3), and Steenken (to be published).

The technical deficiencies in commercial apparatus presently available for fluorescence microscopy have been pointed out by Graham (4). He has pointed out that, in order to obtain maximum fluorescence of the tubercle bacillus, it is necessary to have a matched set of filters—not necessarily expensive—the proper dye and a much more powerful source of light than the one commonly in use. For those who would like to try the method, Graham has scientifically constructed an efficient apparatus for this purpose and has indicated that further work will determine whether or not the method has definite advantages when the technical details are made optimal. Granted, however, that technical obstacles are overcome, there are always microörganisms of typical morphology with faint degrees of fluorescence, just as there are faint degrees of acid-fastness when the Ziehl-Neelsen method of staining is employed. Also it should be emphasized that the Auramine stain, used in fluorescence microscopy, stains all acid-fast microörganisms and is in no sense specific for the tubercle bacillus any more than is carbol fuchsin.

One of the chief advantages of fluorescence microscopy is that a relatively low magnification can be employed in examining the smear. However, this low magnification may lead to confusion in the identification of faintly fluorescent particles. It is true that one can check the morphology of faintly fluorescent microörganisms with higher magnification, if a nonfluorescent oil is used for immersion, but this added precaution eliminates the major advantage of the new technique. Another complaint regarding the new technique is that eye strain is greater.

It is evident that whatever advantage fluorescence microscopy offers will be found in the examination of smears which contain very few bacilli. However, future results with optimal apparatus and technique must be awaited before any definite recommendation for or against fluorescence microscopy can be given.

The Committee on Standard Laboratory Procedure at its last meeting discussed the propriety of its present name and suggested that the Council give consideration to changing the name of the Committee to *Committee on Evaluation of Laboratory Procedures.*

REFERENCES

(1) Report of Committee on Standard Laboratory Procedure: Am. Rev. Tuberc., 1942, *45*, 103.
(2) Freiman, D. G., and Mokotoff, Gertrude F.: Am. Rev. Tuberc., 1943, *48*, 435.
(3) Lee, H. I.: J. Lab. & Clin. Med., 1944, *29*, 218.
(4) Graham, C. F.: Am. Rev. Tuberc., 1943, *48*, 421.

AMERICAN TRUDEAU SOCIETY

Report of the Committee on Coexistent Syphilis and Tuberculosis

Dr. H. I. Spector, *Chairman*

Dr. Henry Chadwick Dr. Reuben Hoffman Dr. Henry C. Sweany

The Committee on Coexistent Syphilis and Tuberculosis met in St. Louis on January 13, 1944. The principal subjects for discussion were as follows:

A critical review of a study made by Dr. Reuben Hoffman of Henryton, Maryland, at the Maryland Tuberculosis Sanatorium, entitled *The Problem of Syphilis and Pulmonary Tuberculosis in the Negro.* The information brought to the Committee by Doctor Hoffman covered a study of over 500 patients with a combination of syphilis and tuberculosis. The findings were very revealing and provocative and stimulated many suggestions by members of the Committee as to future studies at the Maryland Sanatorium, regarding false positive reactions, incidence of the combined diseases, relationship to age, character of lesions, stage of disease, types of treatment, reactions and prognosis with and without treatment of the syphilitic condition.

A short report on an uncontrolled series of over 600 cases of syphilis, treated with the five-day method in which 7 cases of tuberculosis were discovered, was also discussed. The Committee also considered and approved a form to be used at the Mid-Western Medical Center in St. Louis. The Mid-Western Medical Center is a government hospital, under the auspices of the United States Public Hospital Service, for the treatment of venereal diseases. This study is primarily for the purpose of investigating the influence of intensive antiluetic drug therapy on latent, as well as on active, pulmonary lesions. A secondary purpose is to discover the incidence of pulmonary tuberculosis in syphilitics.

The plan of study in coöperation with Doctor Henchett, chief of the hospital, is as follows:

(1) Routine X-ray film of chest is to be taken of every patient prior to treatment and interpreted by a phthisiologist.
(2) X-ray film of chest is to be taken at the conclusion of treatment.
(3) Follow-up X-ray films of the chest are to be taken at certain intervals on all those found with suspicious clinical or X-ray findings after treatment.
(4) Special laboratory and other studies in selected cases are to be made by direction of a phthisiologist.

This study has already begun and is now in progress. Before adjournment, the Committee discussed plans for postwar clinical and experimental investigations of the many problems incidental to the coexistence of syphilis and tuberculosis.

The Committee adjourned at four p.m.

AMERICAN TRUDEAU SOCIETY

Report of the Committee on Coöperation with the American Board of Internal Medicine

Dr. J. Burns Amberson, Jr., *Chairman*

Dr. W. H. Oatway, Jr. Dr. Paul P. McCain Dr. Lewis J. Moorman

The prior arrangement of the Committee on Coöperation with the American Board of Internal Medicine is still working and there have been no changes.

The number of physicians seeking certification in tuberculosis continues to be relatively small on account of war conditions.

The First National Mexican Congress on Tuberculosis and Silicosis

Mexico, D. F.—July 23 to 29, 1944

The Mexican Society for the Study of Tuberculosis and the National Committee for the Campaign against Tuberculosis, under the auspices of the Department of Health and Relief of the Mexican Government, held the first National Congress on Tuberculosis and Silicosis in Mexico City during the week of July 23rd, 1944. Delegations were present from Brazil, Cuba, Peru, Venezuela and the United States, as guests of the Mexican Government. All the physicians in Mexico interested in tuberculosis attended the meetings at the magnificent new Institute of Cardiology and many contributed to the full program of scientific papers. This program was opened on July 23rd by President Camacho and closed by a Grand Ball on the night of July 29th. For the first four days the general sessions in the mornings were occupied by papers and symposia on the topics of mass surveys for tuberculosis, methods and results of surgical treatment, rehabilitation and silicosis. Visits were made to the ultramodern tuberculosis sanatorium at Huipulco and to the General Hospital where surgical demonstrations were put on. On Friday the whole Congress was taken out to the mining town of Pachuca for a day devoted to silicosis, its causes, radiographic study and prophylaxis, as well as a visit to the mines themselves. Closing exercises were held on the final day. Action was taken to found a National Institute for Tuberculosis.

The papers read at the first Mexican Congress and the work of our colleagues in Mexico made certain definite impressions upon the visiting delegates. Foremost was the high quality of the leadership in the campaign against tuberculosis. Dr. Gustavo Baz, the Secretary of Health, and Dr. Manuel Martinez Baez, the Undersecretary, are men of vision, integrity and force. Dr. Ismael Cosio Villegas, Dr. Donato G. Alarcón and Dr. Miguel Jiménez, the Executive President of the Congress, are the phthisiologists furnishing inspiring leadership for many able younger men. Secondly, one is impressed with the boldness of conception expressed equally by the surgical treatment of tuberculosis and by the modern architecture of the new sanatoria and hospitals. The past has been discarded; and the problems of the present are attacked with a realistic aim to obtain the best functional result with the means available. With the exception that family tradition prevents women from going into nursing in sufficient numbers, the authorities in Mexico are able to proceed with the program of education, treatment and prevention, unhampered by preconceived ideas.

Finally, one is impressed by the sincerity with which the Mexican and other Latin-American physicians are coöperating in tuberculosis control as well as in other fields. Their genuine good will and their unbounded hospitality to both persons and ideas from other countries in this hemisphere are most apparent. As one good by-product of the war in Europe this interchange of medical information and amenities is a thing of great value which should be maintained and preserved.

JULIUS LANE WILSON

NOTICE

The Editor would appreciate hearing from any physician, working in the field of pulmonary diseases, who is familiar with Spanish or Portuguese, who would be interested in writing abstracts from the Spanish or Portuguese literature for publication in the Abstract Section of the American Review of Tuberculosis (the abstracts, of course, to be written in English).

NOTICE

Diseases Due to Fungi

Dr. Roger D. Baker, Associate Professor of Pathology in charge of surgical pathology at Duke University School of Medicine, has been appointed Professor and Chairman of the Department of Pathology in the Medical College of Alabama at Birmingham, a division of the University of Alabama. He will move to Birmingham on December 1, 1944. After that date, Dr. Baker requests that autopsy and surgical materials for the Fungus Disease Registry be sent to him at Birmingham 5, Alabama.

The mycologic and serological materials of this Registry should continue to be sent to the office of Dr. David T. Smith, Duke Hospital, Durham, North Carolina.

(See notices on pages 393 and 394 in the April, 1944 issue of the REVIEW.)